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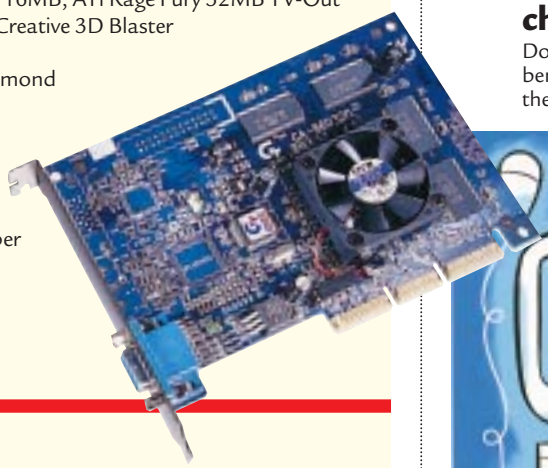

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AMD and Intel are locked in a battle to have the quickest chip.

On the fast track

After last month's cover story about the vapour phase refrigerated PC running at 800MHz, we're already seeing chips nipping at its heels without the need for overclocking. This month we've seen the launch of the 700MHz Athlon chip. This CPU needs no refrigeration unit and actually runs cooler than its 600MHz sibling due to a drop in voltage. With this latest release AMD has a significant lead on Intel in the performance processor market. At present Intel is stuck at the 600MHz level with its Pentium III chip. Even with the introduction of the 133MHz front-side bus, the performance hasn't made a significant jump forward. Add to this the fact that the RAMBUS memory employed by the new Intel 820 chipset is exorbitantly expensive and an Intel solution starts to look even less attractive.

Of course, you'd have to be a fool to count Intel out at this early stage, and just because AMD has the better product at the moment doesn't mean the game is won.

There are already rumours that Intel will be leapfrogging its scheduled 667MHz chip in favour of a 733MHz flavour, ultimately buying its way back into the numbers game. But whether this move will be enough remains to be seen, with AMD already preparing for a 750MHz Athlon. If Intel strikes back with a faster chip of its own, it won't be long before we see processors in excess of 1,000MHz.

However, a high MHz number is not the deciding factor when it comes to performance. The Athlon is a more advanced design than the Pentium III and we still haven't seen any software using it to its full potential. Add to this the fact that the Athlons we're seeing now are the basic versions – models with faster and larger complements of Level 2 cache are on the way – and its obvious that the PC processor market is about to surge forward faster than it ever has.

If Intel strikes back with a faster chip of its own, it won't be long before we see the first processors in EXCESS OF 1,000MHz

The question that has to be asked is whether anyone needs this amount of processing power. Obviously someone rendering 3D animation scenes in LightWave or 3D Studio Max will want all the power they can get, but the majority of users could be paying for something they will never use.

Thankfully both Intel and AMD are offering budget alternatives to their sky-reaching premier chips, in the shape of the Celeron and the K6-III. Either of these processors will build up into a decent PC that should run anything you're likely to throw at it.

That said, Intel is well aware of this situation and has adapted its already successful marketing campaign around it. Intel isn't selling the Pentium III on the basis that it's a fast CPU, it's telling the masses that the PIII is a necessary component for utilising the Internet to its full effect. With the Internet being a major consideration for prospective PC buyers, the company may well have come up with its best idea since 'Intel inside'.

Riyad Emeran, Acting Editor

PERSONAL COMPUTER WORLD

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vnu business publications

PERSONAL COMPUTER WORLD

WELCOME TO THE DECEMBER 1999 PERSONAL COMPUTER WORLD CD-ROM

December COVER DISC

GAMES | APPLICATIONS | LIBRARY | ENTERTAINMENT | INTERNET

The impenetrable world of astro-physics may seem impossible to fathom, but Stephen Hawking brought it to life in his book *A Brief History of Time*. Now *PCW* has brought it to you on this interactive CD-ROM, along with full versions of other top software titles

A Brief History of Time

Stephen Hawking believes that all of us should be able to understand the basics of physics and cosmology. His book, *A Brief History of Time*, presents a graceful and carefully reasoned description of these thoughts, and this software is your introduction to these ideas. Don't be intimidated by the physics! The concepts Hawking presents are fantastic and fun. They will entertain and challenge you.

After the optional introduction you will find yourself in Stephen Hawking's room. Almost every subject on the disc is available from here. Clicking on the small Hawking icon present on every screen will bring you back to this room.

Roll around this screen and various icons will light up. Each leads to an adventure related to a topic in the book. You can also explore the book itself by clicking on the Book icon. On the wall is a honeycomb chart. Click on this and you're given the options for the main screens of each chapter. Each of these contains a number of departures to ideas within that chapter. At every stage, there is an icon to take you one screen forward, one to take you one screen backward and one which will take you to the main screen for the chapter you are in. Another icon will take you to Hawking's Office. The Book icon is only present where there is an appropriate link to the book.

The door on the left of Hawking's room takes you to the Hawking Craft. Here you can venture out to the event horizon of a black hole where Hawking will explain the causes and consequences of its existence. Roll over the small buttons around the centre panel and the panel will light up with a related subject. Click on these buttons for a detailed explanation of the subject. The material is illustrated with a combination of graphics, animation, video, audio voice-overs and text. Tapping the space bar will bring up a panel allowing you to adjust the sound level.

Where the Book icon is present you can bounce back and forth between the text and the illustrations, and between the text and the glossary.

You can go directly to any section that intrigues you or step through the illustrations one at a time. If you wish to go through the disc in a linear fashion, simply switch on the auto-play button and the disc will play each chapter from beginning to end. Note that in the Hawking Craft there is no auto-play facility. Here you trigger the next logical screen by clicking on the Continue light flashing at the top of the viewing screen.

■ Problems running A Brief History of Time

Some machines may display a blue screen with an error message when first running A Brief History of Time from the entry added to the START menu during installation. It may then be impossible to escape from this screen. If this happens please try the following:
Restart your machine by pressing the ALT, CTRL and DELETE keys together. When the system has come back to the desktop, run the following program from the CD:
<CD drive>:\brieffix\BriefFix.EXE
When this has completed, try running A Brief History of Time again from the START menu.
If the program continues to fail you will have to edit the QTW.INI file manually:
1. Select START then FIND, then FILES OR FOLDERS.
2. In the 'named' box enter QTW.INI and press Find. Once the file has been found, double click on it's icon. Notepad will load and display the contents of this file.
3. In the [VIDEO] section the 'optimize' option needs to be changed to one of the following:
Optimize=hardware
Optimize=BMP
Optimize=Driver
Optimize=Raw
Or Optimize=Dib
Start with 'hardware', save the file, reboot your computer (Start, Shutdown, Restart) and try again.
If this still fails, please call Focus Multimedia Technical Support Department on Tel: +44 (0)1889 570589 (Monday to Friday, 10am to 1pm then 2pm to 4pm).

PCW DETAILS

Platform
Windows 95/98
Limitations
Full Version
Sales Contact
01889 583571
Technical Support
01889 570589 (Mon-Fri 10:00-1:00pm/ 2pm-4:00pm Mon-Fri)

Repligator 3

◀EVEN OUR OWN *PCW* LOGO LOOKS WIERD AND WHACKY AFTER BEING GIVEN THE REPLIGATOR TREATMENT

There are already many paint programs available that can create some stunning visual effects, but they usually involve an enormous investment in time, learning, and mouse shifting. Above all, these mathematical effects are often difficult to install, difficult to understand and with an unintuitive, complex interface.

Repligator is an easy way to completely transform your images with colourful and unique effects. Scan your old photographs and let Repligator liven them up, even black and white photos become colourful with this package. It is just what you need for creating new web images and logos that look great but require the minimum of effort to produce.

Repligator works by generating a whole sequence of images using a variety of graphics filters called Xforms. All you have to do is to choose the ones you like the most and then tweak them to achieve the desired effect (that is if you feel the need).

PCW DETAILS

Platform
Windows 95/98/NT4
Limitations
Full Version
Sales Contact
01889 564601
Technical Support
01889 564601 (Mon-Fri 9:00-17:00)

Repligator 5

The latest version of Repligator offers you the same high-quality image creation and manipulation features of it's predecessors, but it now also includes these innovative new features:

☛ **Printing:** You now have the hassle-free option of sending your revamped images direct to your printer from Repligator!

☛ **Advanced Selection:** Not only will Repligator smooth the original image but you can get the Xform to look for edges as well – making cut-outs a doddle.

☛ **New Xforms:** Colour Television, Embroidery, Mondrian, Peeling Plaster and Jackson Pollock. A whole new arsenal of graphics filters is available for you to experiment with and help you make your images really stand out from the crowd.

To get you started straightaway, take a look at the Product Information section for Repligator 5 on the CD for a mini tutorial.

▲AN ENTIRE NEW RANGE OF XFORM GRAPHICS FILTERS WILL HELP YOU PRODUCE STUNNING RESULTS FROM THE WILDEST OF IDEAS

PCW DETAILS

Platform
Windows 95/98
Limitations
Trial Version
Sales Contact
01889 564601
Technical Support
01889 570589 (Mon-Fri 10:00am-1:00pm/ 2pm-4:00pm Mon-Fri)

Desktop Lawyer

This software provides you with easy access to the labyrinthine world of the Law. Your first step is to search for the 'intelligent' Rapidocs document you want, prepared by top UK Barristers. Then download, purchase it and create your document using Rapidocs Assembler 1.01.02 which is provided on this CD-ROM.

Rapidocs Assembler is used to automatically alter/draft the document templates, by completing a question and answer routine set for each document. A number of documents are already included so you won't have to purchase them.

Assembling a Rapidocs document template is simple. First, select the required document, Rapidocs will then build up the document, guiding you step-by-step through the process by asking a series of questions. It will provide you with helpful examples and easy-to-follow instructions throughout this process. The document is constructed in real time, on-screen as each question is completed. Following assembly it is then possible to edit the document to suit your particular requirements. You can then print it out, save your answers to the questionnaire and the assembled document or export it to any Windows word-processor.

PCW DETAILS

Platform
Windows 95/98/NT
Limitations
Free for the first single user licence
Sales Contact
0208 931 3030
Technical Support
Hyperlink 0870 5084251 (Mon-Fri 10:00-17:00)

EuroCalc

EuroCalc is capable of converting a currency of your choice into Euro and several other currencies as well as calculating the VAT according to the chosen country. It respects the European regulation concerning the rounding up and conversion procedures and it updates its exchange rates directly from the Internet.

Integrated within EuroCalc is a price simulator, which demonstrates the impact of the conversion on your strategic values and helps you reposition them to maximum advantage. The conversion function has been integrated within Word and Excel.

▼MAKE SURE YOU'RE GETTING YOUR MONEY'S WORTH WITH EUROCALC

The EuroCalc package is completed by an interactive document base containing all the key information on the Euro – in particular the official database of the European Commission 'QUEST' (Questions and answers on the euro and European Economic and Monetary Union. © European Commission 1997).

The calculator performs the four standard mathematical operations and supports the memory function. It can be operated using either the mouse, the keyboard or the numeric keypad. Its 'three-screen display' enables the immediate conversion of each currency into another using an intermediary currency (Euro or Dollar).

The initial and the target currencies are selected from a menu listing relevant world currencies and a button allows you to quickly invert the direction of conversion. Its management of the number of decimal places used for the rounding up procedure is automatic and conforms to the European Regulation.

The lower section of the calculator displays the flags of each country, which represent the currencies available within EuroCalc. From this band you can also insert or delete a currency and modify the parameters relative to the selected country (eg exchange rates in relation to the Euro or the Dollar, local time, VAT rates.)

PCW DETAILS

Platform
Windows 95/98/NT
Limitations
30 Day Trial
Sales Contact
0181 387 5550
Technical Support
Hyperlink mail to:support@aqtive.com
support@euro-direct.com

PaintShop Pro 4.15

Paint Shop Pro is a raster-format image-editing application – a type of software more commonly known as a 'painting program'. A common example of a raster image is the Windows BMP format.

Paint Shop Pro is a fully-featured pixel editor: you can use it to draw new images from scratch, and to alter existing images by adding and editing objects. Version 4.15 contains numerous painting and drawing tools and a variety of image processing functions.

It is professional standard image-editing software, with a highly intuitive interface, and includes the following features:

- Support for over 30 graphic formats, including CorelDraw 6 and Corel CMX
- Complete photo-retouching capabilities
- Support for TWAIN scanners
- Screen capturing
- Batch format conversion

Integrated image browser

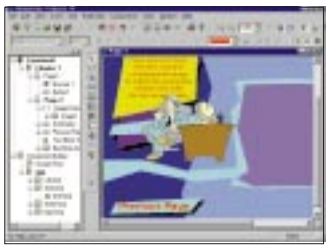
PCW DETAILS

Platform
Windows 9x/NT
Limitations
Full version
Sales Contact
sales@digitalworkshop.co.uk
Technical Support
Any problems with Paint Shop Pro should be addressed to: techsupport@digitalworkshop.co.uk

Illuminatus 4.5

Illuminatus is a multimedia authoring package, that allows even beginners to quickly and easily combine words, pictures, video, animation and sound into interactive publications.

A series of wizards have been added to the program, to guide you through from planning to publication, helping multimedia novices to get up and running from day one – and allowing experienced users to make immediate productivity gains too.



The new Publish Wizard allows you to publish your presentations as Windows programs, screensavers and directly to the Internet for viewing via a Netscape plug-in or IE ActiveX control. Alternatively, you can export your publications to HTML 4.

New Question Wizards assist in the creation of simple or complex interactive quizzes to help you to provide a stimulating teaching or training environment. And by using the built in compression abilities it's possible to shrink your publications for fast Internet delivery.

With Illuminatus, ease of use does not translate into a limited feature set. There's plenty here for the professionals to get their teeth into as well. Three levels of complexity allow beginners to start slowly and work their way up to the more advanced features. Seasoned multimedia authors can jump straight to level 3 and into the full power of the Illuminatus environment.

PCW DETAILS

Platform
Windows 95/98/NT
Limitations
30 day & Function Limited
Sales Contact
01295 258 335
Technical Support
01295 258 335

onCue 1.0

This handy desktop toolbar from aQtive gives you fast and easy access to a range of services on the Internet and on your computer. onCue is clever enough to recognise the sort of things you're doing and then suggest what's appropriate.

If you are a novice, it brings the best of the Internet to you, when you need it. It cuts through the mess and tangle and helps you get to useful services.

Even if you consider yourself an expert, onCue can still help – by getting you where you want to be faster and with less effort.

How it works

The program saves you time by monitoring the data that is copied to the clipboard, and suggesting things that you might want to do with that information.

Every time you copy anything, onCue analyses what you have copied and icons appear in the onCue window representing Internet services and desktop applications that you may want to use with the text you have copied – including looking up maps from post codes, drawing histograms from tables and checking the spelling of words.

The program works with all applications that support copying and pasting, for example Internet Explorer, Netscape Navigator, Lotus SmartSuite, Microsoft Office and the majority of other desktop applications.

onCue has been designed to be left on the edge of your screen as you work. It will suggest what to do when you copy things in the course of your everyday tasks.

Requirements

If you do not already have the Java Runtime Environment (2.85MB) installed on your PC, then this software will require you to go online and download it.

PCW DETAILS

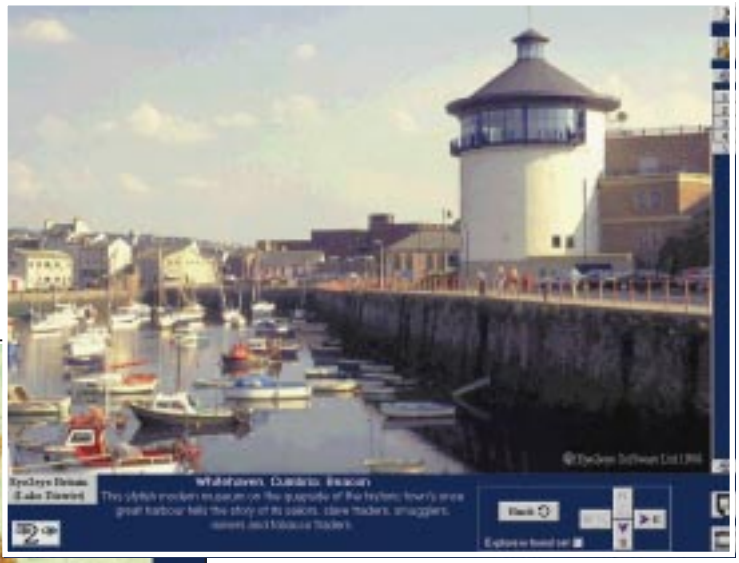
Platform
Windows 95/98/NT
Limitations
Full version
Sales Contact
0121 4142626
Technical Support
Technical support is available by emailing: support@aqtive.com

Eye2eye Britain

Looking for facts about somewhere you've been in the Lake District, or trying to find information before you take a trip? Now you can explore one of Britain's most beautiful areas without leaving the comfort of your own home, with Eye2eye Britain PC CD-ROM.

This program allows you to step North, East, South and West between places, and includes stunning almost full-screen images for a unique exploring experience. And with the wealth of information available, you can explore for fun, facts or to get ideas for trips.

Eye2eye Britain (Lake District) includes the Eye2eye Britain exploring system, with its innovative features, such as stepping to explore, animated slideshow journeys and printing enabled, and no time limit. You can use it to explore the large, varied and beautiful landscapes of the Lake District, which is shown in 64 images of 24 places – including towns, TV locations and local heritage.



PCW DETAILS

Platform
Windows 95/98
Limitations
Function Limited
Sales Contact
01223 293886
Technical Support
01223 293886

Technical information to help you use the CD

✓ **How to use the CD-ROM**
Put the disc into your CD drive: **Windows 9x** If you've got Windows 9x, the *PCW* interactive loader will appear on your screen. If your CD doesn't autoload, go to Start/Run and type in **<CD Drive>:\pcw.exe** **Windows 3.1** From Windows Program Manager, choose File/Run, then type in **<CD Drive>:\pcw.exe** and press enter.

✓ **System Requirements**
You will need a PC running Windows 3.1 or Windows 9x. The disc will run under Windows NT but functionality may be reduced. Please check individual products for specific system requirements. For best results, run the CD on a Pentium PC with at least 16Mb of memory running in 16bit colour depth (thousands of colours).

✓ **Faulty Discs**
If your drive continually scans the disc without starting, or displays read errors, you may have a faulty disc. In this event, please return the disc with a covering note, detailing your name and address, and clearly marked "PCW CD DECEMBER 1999", to:
TIB plc
HelpLine Returns
Unit 5 Triangle Business Park
Pentrebach
Merthyr Tydfill
Mid Glamorgan CF48 4YB
quoting reference 'PCW Vol 22 No 8'.

A replacement disc will be sent to you by post. NOTE: *Replacement discs cannot be supplied direct from the VNU offices.*

✓ **Technical Support**
If you have technical problems with individual products, please check in the magazine or on the CD for the manufacturer's support contact details. For general problems with the CD, the Technical Helpline is open weekdays from 10:30am to 12:30pm and 1.30pm to 4:30pm on 01685 354726.
A live technical info page is also available through CDOnline direct from the CD. Please see "Faulty Discs" for replacement disc information.

✓ **Getting software on to the CD**
Personal Computer World is keen to promote quality software and would like to hear from you if you are interested in having your product included on a future cover disc.
For cover-mount enquiries please telephone Afshan Nasim on 0171 316 9592 or email afshan_nasim@vnu.co.uk.

IMPORTANT NOTICE

These products are for personal use only, on one PC at a time. You may not rent, lease, assign, re-sell or otherwise transfer the rights to anyone for any product contained on this CD, or use any product for public performance. Neither the suppliers nor the publisher shall accept responsibility for any losses or damage resulting from use of this software, including any loss of profit, damage to equipment, interruption of business or data or any other damage either direct or accidental. It is recommended that you back up any programs and data on your hard disk before installing any software. Please read the installation and system requirement instructions carefully before using.

The publisher, VNU, has checked the *Personal Computer World* CD-ROM for known viruses at all stages of production, but cannot accept liability for damage caused either to your data or your computer system, which may occur while using either the disc or any software contained on it. If you do not agree with these conditions, you should not use the disc.

It is good practice to run a virus checker on any new software before running it on your computer, and also to make regular backup copies of all your important data.

Unless otherwise stated, all of the software contained on the CD is for demonstration only. This means it may be restricted in some way: for example, it may be time limited or have certain functions disabled.

Lotus Notes Release 5

This month's bonus CD is a 45-day trial version of Lotus Notes Release 5, which combines all of your daily office needs in a format that is easy to browse.

Lotus Notes Release 5 (R5) provides state-of-the-art email, calendaring, group scheduling, web access and information management. The Notes user interface has a powerful, proven messaging and collaboration engine at its core, but is now wrapped in an easy-to-use environment that's highly customisable. In fact, the user experience in Lotus Notes R5 is like using a simple browser – right down to the navigation, bookmarks, search facilities and rich HTML documents.

However, Lotus Notes is much more than a browser, because it integrates so many disparate data types. For example, a Notes bookmark can be a web page, email, newsgroup posting, or a Notes/Domino database, view or document. It can even be a blank form, such as an expense or customer contact form that gets filled out repeatedly.

Full standards support transforms Notes into a freestanding Internet client. At the same time, it retains its unrivaled power as the premier Domino client. Notes R5 leverages the functionality and user experience of other Lotus products like cc:Mail and Organiser.

The design of Notes R5 is centred on five discrete goals/priorities:

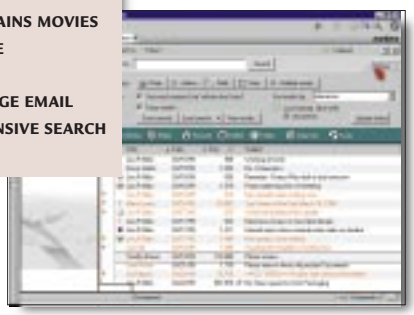
1. Works with any server
2. Easiest Internet client to use
3. Industry-leading email and collaboration
4. Mobile support and ease of deployment
5. Innovation in collaboration – knowledge management

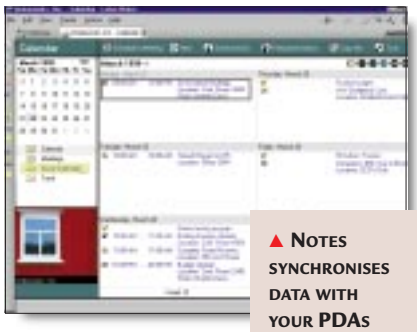
Key Features and Benefits:

Email and calendaring

- Email enhancements: Signature files let you personalise your emails by including information such as your title, address, and phone number on each message. Point-and-click Rules make it easy to manage your in-box. The automatic spell checker can be also set to check every message before sending.
- Calendaring for all: The Group Calendar allows members of work teams to see the free and busy time slots of all team members at once. Administrative assistants with the proper access rights can also schedule appointments and manage the calendars of multiple people at the same time.
- Actioneer integration: Actioneer for Notes R5 is a smart user-interface that simplifies and speeds up information entry and retrieval.
- Lightweight directory catalogue: You can put an entire company's employee directory right on your hard drive, in a highly-compressed format, for access even when you're out of the office. This directory supports LDAP lookups for quick searches.

▲ THE CD CONTAINS MOVIES TO DEMONSTRATE FUNCTIONALITY
▶EASY-TO-MANAGE EMAIL WITH COMPREHENSIVE SEARCH FEATURES





▲ NOTES SYNCHRONISES DATA WITH YOUR PDAS

Collaborative power

- Welcome Page: A customisable Welcome Page allows you to choose the layout that best suits your work style. For example, you can combine your email in-box and daily calendar along with stock quotes and business headlines from the web, all in a single view. It acts like a browser's home page – it's the first thing that appears when you launch Notes, and can be returned to with a single click. Firms can customise the Welcome Page to include a company logo, and even have it present dynamic information feeds for employee broadcasts.
- Bookmark Bar: This contains quick links to all the core Notes applications, as well as web pages.
- Window Tabs: A separate Window Tab appears at the top of your screen for each piece of information that you open.
- Search: A single search engine can find information across both your company network and the web.

Lets you work anywhere

Notes synchronises data with your laptop and personal digital assistant (PDA) so you can take email, appointments, to-do's, contacts and more on the road.

Easy installation and setup

Whether you're setting up Notes to receive mail from existing ISP-hosted accounts or routing multiple accounts into your universal in-box, the setup wizards guide you every step along the way. They even automatically create dial-up networking entries for you during the installation process. A selection of preset configurations make you productive within minutes.

PCW DETAILS

Platform
Windows 9x/NT,Mac PowerPC 7.6/8.5
Limitations
45day trial version
Sales Contact
Software Warehouse
0171 836 0599
Technical Support
01685 354726

Send your news and views to news@pcw.co.uk

Edited by CLIVE AKASS

Our new-look website

Our website has been long overdue for an overhaul, as many of you have not been slow to point out. We took our time because we wanted to get it right, and the new-look site is now up for you to see.

Like other magazine houses, our parent VNU decided to opt for an umbrella site. This means *Personal Computer World* readers can also get the benefit of our sister publications. These include *Computing*, *What PC?* and *ComputerActive*.

You will still be able to reach the site from *www.pcw.co.uk*, where we will have some of our own content. Exactly how much we have yet to work out. But you can be sure there will be more of everything for everyone.

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BT pricing users away from ADSL, say access providers

ADSL may not have such a huge speed advantage over cable modems as was originally expected, says UUNet's Steve Groves.

Cable users have to share local bandwidth between people on their local loop, giving them a minimum 400Kbit/sec.

ADSL offers a guaranteed link of between 512Kbit and 2Mbit – but that is only to the local exchange. Lines from there to your service provider – the on-ramp to the Internet – are shared.

BT allocates capacity on the assumption that the equivalent of only one-in-20 ADSL lines is in full use at any one time, which means the service may deteriorate at peak times just as with cable.

British Telecom has priced its fast ADSL services too high for both small businesses and homes, say service providers – including one of BT's own divisions.

Grant Groster, head of BT Internet Business Services, said ADSL is 'not positioned to make inroads' into this market. But he added: 'We are talking [to BT] and if it is priced attractively we will certainly be introducing it.'

BT is selling ADSL through providers like UUNet, Virgin and Easynet, rather than direct to users. For its basic IPStream service, vendors are charged £40 to £150 per month for connections of between 512Kbit/sec and 2Mbit/sec.

It has emerged that there is a far more interesting option called DataStream, which could lead to a broader range of services and access boxes. But DataStream requires vendors to invest 'in excess of £10m a year' for a national service, says UUNet.

With IPStream, BT installs all the lines and boxes needed to deliver IP services via a 10Mbit/sec Ethernet port. Neither user nor vendor has a choice of equipment.

DataStream delivers Asynchronous Transfer Mode (ATM) data to the home or office. It is up to the service provider to then decide how it will present the data to the user. This has two huge advantages:

- Raw ATM, unlike IP at present, is good at delivering multimedia data such as streaming video.
- ADSL service providers could offer new services, such as video on demand directly to TV sets, rather than just IP data direct to a PC.

UUNet product manager Steve Groves said operators will have to pay up to £29,000 a year for each of BT's 400 exchanges from which they want to provide DataStream services.

He said UUNet could offer the service in high-demand areas, but it would prefer to provide a national service, which at BT prices is a very expensive proposition. BT is also insisting that operators commit to supporting at least 50 users per exchange.

'DataStream could allow small operators to offer a variety of services. But the cost of entering the market is too high for them,' said Groves.

UUNet has sent a protest about the prices to telecoms watchdog Oftel.

The BT charges quoted so far are based on business lines. Consumer prices may end up being cheaper than these. A BT spokesman said: 'I don't believe £40 a month is high for a [512Kbit/sec] always-on connection.'

He expected vendors to charge less, getting extra revenue from adverts and commerce. He said: 'We are committed to making this a mass market. You will see costs come down.'

CLIVE AKASS
VNU NEWSWIRE

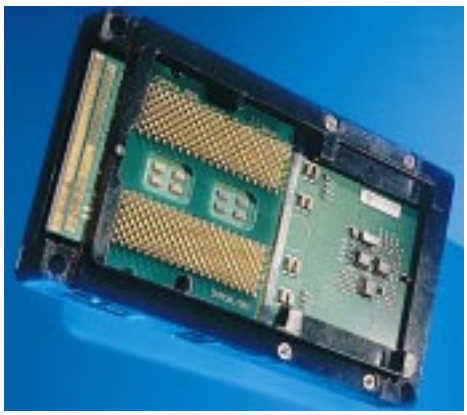
• *Point of view – page 28*

Intel offers first look at Merced

This is the first official picture of Intel's IA-64 processor, which is due to ship next year. The chip, previously know as Merced, is now officially to be called Itanium. It was given its first public airing at the Intel Developer's Forum in Florida, but as Gordon Laing reports on page 46, it gave little indication of its potential.

All the running at the moment is being made by AMD's 32bit 700MHz Athlon, which is being used by a whole raft of PC vendors including IBM and Compaq.

But Intel could take the performance lead again this month, with two 733MHz processors, a PIII and a PIII Xeon, using 0.18 micron architecture. Intel denies that its launch is



Continued on page 28

New chip war

● *continued from page 27*

a response to the Athlon, saying it is not targetted at the same market as the PIIIs.

But the new 0.18 micron chips have been launched earlier than expected, hot on the heels of the new AMDs.

With Intel admitting to a bug in its RAMBUS-enabled 820 chipset (*see opposite*), the big question is what kind of RAM these processors will use. A source who has tried a PIII 733MHz with RAMBUS said it 'blows away' the Athlon.

PC prices hit by parts shortage

Rising memory costs have pushed up PC prices in the run-up to the Christmas rush. Vendors also face a shortage of silicon following the Taiwan quake.

A 128MB SDRAM module that cost $60 in July, cost $240 just two months later. This forced vendors to put up prices by around £60.

This was before the quake that hit many chipmakers, including UMC, the second biggest supplier of custom chips, and the big Taiwan Semiconductor Manufacturing Company. UMC supplies the silicon for SanDisk flash memory modules. Days after the quake it said production had not been hit as hard as had been thought, but it was still down on full capacity.

Robin Saxby, head of specialist chipmaker ARM, told a Cambridge conference that the full impact of the Taiwan quake would be hard to guess for some time.

Flash memory was getting scarce even before the quake because of a mushrooming demand for mobile phones.

There were also reported shortages of some PC chipsets, a situation which is unlikely to be helped by the bug in Intel's new 820 (see opposite).

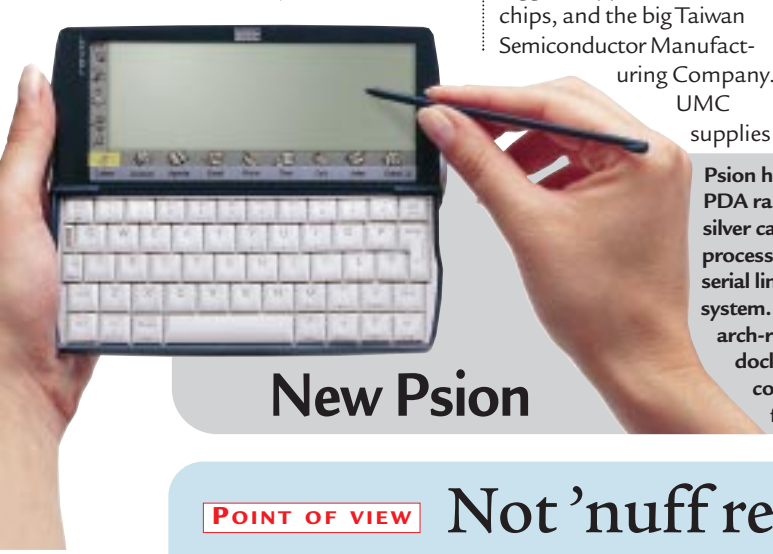
Evesham Micro purchasing director Luke Ireland said the companies that were most likely to be hit by shortages were those which chop and change suppliers to get the best price.

'A lot of people have been buying on the spot rather than building a relationship with a supplier so that you get support when something such as this happens.'

Ireland said he had just come back from Taiwan, where the situation was far worse than was reported, particularly with electricity supplies.

He said the Taiwanese had made no plans to cope with the disaster. 'They work on the basis that everything will be all right. It's a strange stance to take when you live in an earthquake zone.'

ADDITIONAL REPORTING
VNU NEWSWIRE



New Psion

Psion has launched a new model in its PDA range, called the Revo. It boasts a silver case, a 36MHz ARM 710 processor, 8MB of RAM, an improved serial link and the latest Epoc 5 operating system. Psion has taken a leaf out of arch-rival 3Com's book by bundling a docking station with PsiWin connectivity software. Watch out for a review next month.

POINT OF VIEW

Not 'nuff respect

Once upon what seems a very long time ago, soldiers came back from a big war with fine dreams of creating a world fit for heroes. All the services needed by people would be owned by the people for the benefit of the people.

To the astonishment of the world they voted out the great war leader Churchill and voted in the Labour Government of Clement Atlee, which proceeded to nationalise everything in sight.

It all went wrong of course. The world could not be reduced to ideology (although even some Labour opponents tried) and most of the old public-owned industries have been re-privatised. But this too has its snags. What happens when national interest collides with the commercial interests of a company providing a public service?

A lot of obfuscation happens, if BT's pricing of ADSL is anything to go by. This is not a matter of a minor market pitch: ADSL is national infrastructure, like the roads and railways.

Within a few years, even a few months, all commerce will essentially be ecommerce – if only to the extent that at some point a transaction will hit the wires. ADSL will mediate much of this activity and if we don't get it right we could lose out to countries that do.

We may also lose an opportunity to get a head start. We have the advantage, for a global medium, of speaking a global language; we are respected global content providers; and a legacy of the monolithic pre-BT nationalised phone service is a homogeneous network that is relatively easily upgraded. The US, by contrast, is having to upgrade piecemeal.

First, we need to kick-start mass use of the Internet, and for that we need fast always-on links such as ADSL. The economics of its pricing are complex. But consider two statements by Ovum analyst John Matthews (see page 37): that carriers still cling to monopolistic practices; and that transmission costs are negligible compared with those of billing and management.

These major costs are not going to be higher for higher bandwidth use – indeed ADSL, being flat rate, is very cheap to bill. Most analysts agree that the cost of bandwidth will become infinitesimally small with mass use. Even BT admits costs will fall rapidly, and there is no chance of it failing to recoup its ADSL investment. There is no excuse for these high threshhold prices.

If Oftel won't jump on BT it's time MPs did. And it is time BT paid some respect to the wartime ideals which, in an odd way, gave birth to it – by balancing profit with some sense of public duty.

Clive Akass ***on BT biting the hand that once fed it***

RAMBUStification over new Intel bug

Intel was on the defensive last month after it was forced to withdraw boards supporting the new fast RAMBUS memory.

Vendors have spent millions preparing to launch PCs using the boards, based on the new 820 chipset that runs a 133MHz front-side bus and is designed to talk to RAMBUS.

There were several reports of data loss using the 820 with three RAMBUS modules – it seems to have no problems with two.

Intel said the 820 would be released when the problems were sorted out, but it could not say how long that would take. A spokesman said the cost could not be assessed but would be minimal because the bug had been discovered before production machines began shipping. That said, we have an 820-based machine in this issue (see p82)

But the decision will have knock-on effects throughout the industry. Samsung, for instance, has invested much in RAMBUS production assuming an immediate demand for the chips.

One winner will be rival chipmaker VIA, which offers a chipset supporting SDRAM and a 133MHz front-side-bus.

Intel chips support SDRAM only with a 100HMz bus, though the company now says it will offer 133MHz SDRAM support early next year.

Such is the confusion about the 820 that Intel was reported to be telling some vendors to use the VIA chips.

IBM is doing just that with its new range of workstations. Worldwide workstation product manager Bob Gleason said: 'We will support RAMBUS when the problems with the 820 are sorted out.'

He still expected to launch PCs using the multi-processor version, the 840, later this month; this does not seem to share the bug.

Several UK vendors also had 820 boards withdrawn.

Some analysts doubted whether Intel could persuade vendors to jump back on the RAMBUS wagon.

But Intel says SDRAM does not have the performance to keep up with its emerging range of 700MHz-plus processors.

Ironically, rising prices have eroded SDRAM's price edge over RAMBUS. And RAMBUS prices are expected to fall when it goes into mass use.

IBM launches a mini ThinkPad

IBM has launched its first mini notebook. The ThinkPad 240 (right) weighs1.3kg complete with a 10.4in SVGA colour screen, a full-size keyboard, 64MB of RAM, and a 6.4GB hard disk. It keeps the weight down by using an external floppy drive, which is bundled as standard.

But it differs from many minis in packing all the ports on board, instead of on a bundled extension unit as on, say, the Sony Vaio 505. An optional CD drive links via a PC Card. The ThinkPad will cost £1,495 ex VAT.

IBM has also launched a range of new multimedia ThinkPads. The i series models are all based on 400MHz and 433MHz Celerons and come with a selection of coloured lid covers (left), Prices start at £1,106 ex VAT.

IBM is plugging security as the big selling point of its new 300PL business models. They pack encryption chips which offer several ways to protect your files. The lower-end 300GL PCs have IBM's new Smart Card starter kit as an optional measure to prevent data theft.

Both ranges feature the latest Intels up to 600MHz and a 133MHz front-side bus (see above). Prices (ex VAT) start at £816 for the GLs and £993 for the PLs.

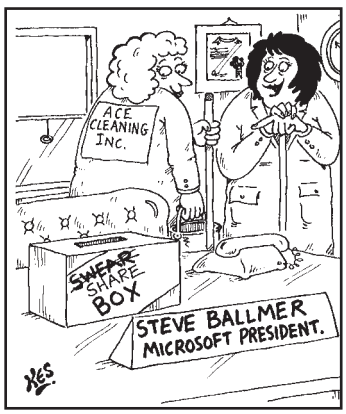
Ballmer's $1bn clanger

A throwaway remark by Microsoft president Steve Ballmer cost him around $1bn last month.

'There is such an overvaluation of technology stocks, it is absurd. I could put our own company and others in that category,' he told journalists at a Society of American Business Editors and Writers conference.

Asked then what Microsoft's stock price should be, he said: 'Less.' Ballmer, who has a propensity for making off-the-cuff remarks, added: 'I used to believe in the theory of perfect markets, but I no longer believe that.'

They certainly weren't perfect for him. Microsoft stocks fell $23bn in value the next day, representing a $1bn loss to Ballmer himself. **Tim Bajarin**



'He has to put in $1bn each time he mentions the words stock or share.'

Free access hits AOL stocks

Various US service providers have followed Britain's lead in offering fee-free Internet access. America Online's shares have fallen by nearly 50 per cent since April, in part because of fears that free and cut-rate services might force it to cut fees that made up 70 per cent of its revenue last year.

Free access has caught on in a big way here. NetZero, the largest free provider, has more than 1.7 million registered users. Microsoft has hinted that it may cut MSN access fees to attract users.

But some analysts say AOL has little to fear because the free-access business model is flawed, relying too much on future advertising revenue.

AOL president Bob Pittman, whose 18 million users pay $21.95 monthly, said: 'If we didn't have those fees, AOL would lose money.' (*NB: In the UK, which has different costs, AOL has started a free service called Netscape Online*).

Silicon Valley's most secretive start-up, Transmeta, may shed light on its business at the Comdex trade fair in November, says one of its famous employees. 'I think I can now tell you when I will be able to tell you,' Linus Torvalds said at a recent seminar. 'The company has considered saying something at Comdex, or at least saying when we will announce something.'

Others known to be involved with Transmeta include Microsoft's co-founder Paul Allen and chief executive David Ditzel. All have been careful not to reveal what the company is up to. The combination of Allen's money, Torvalds know-how, the secrecy and this year's Linux hype has fuelled speculation.

Best guesses are that the company is working on either a revolutionary high-speed computer chip, or on software improving the way chips work, or both.

Tim Bajarin
letter from Silicon Valley

Upgrade cost warning as final Win2K beta ships

Microsoft released the last major beta version of Windows 2000 last month as analysts warned that migration to the new operating system, successor to NT4, will be 'prohibitive' for many businesses.

The operating system is set for what Microsofties call RTM (release to manufacturing) on 15 November. Another beta, Release Candidate 3 (RC3), due on 27 October, is a last minute build for top testers and vendors.

The claimed benefits of Windows 2000 are improved manageability, performance, and application compatibility; simplified Internet connection and domain-name server configuration; a cleaner interface and better drive support.

Win2K was originally conceived as the convergence of Microsoft's Win 9x and NT operating systems, most usefully in supporting a common set of drivers. But the two OS strains will now lead separate lives at least for the next couple of years.

Adoption of Win2K is likely to be slowed by fears over the Y2K bug. But analysts at the Gartner Group also warned that most companies migrating from NT4 or Windows 9x will be hard pushed to recoup their investment within three years. Analyst Michael Gartenberg reckoned it cost organisations as much as $2,050 per seat to migrate from NT Workstation and up to $3,100 per seat from Win 9x. And these estimates do not take into account the costs of implementing back-end servers or Active Directory, which are needed to optimise performance.

Mark Tenant, Windows NT Server product manager at Microsoft, claimed the figures were based on incorrect licensing information and included costs that were not part of migration. 'Many of our large customers will have special licence and multi-user agreements that will bring the cost down... The [Gartner] costs are artificially inflated, and definitely flawed, he said.

He cited a report estimating huge savings for one big customer. One cost-saver is the ability to load Win2k on both laptops and desktops - many companies have had problems trying to use NT4 on laptops,

Meanwhile, Darren Kessner, a researcher at anti-virus company Symantec, warned that some Win2K enhancements may provide new avenues of virus infection.

Digital camcorder goes mega

Sony claims its DCR PC-100 digital video camcoder is the first boasting a megapixel image chip. It uses Sony's Memory Sticks for storage, but with only a maximum 32Mb of memory they will hardly be big enough to film War and Peace. Hitachi, by contrast, has a digital camcorder in the pipeline, using reusable DVD RAM for storage. It was shown at a tradefair in Germany last month but a shipping date has yet to be announced. Panasonic showed a sub-£1,000 digital camcorder boasting a 10x optical zoom.

Nokia unveils fast wireless kit

Nokia has unveiled some of its third-generation mobile technology in the run-up to Telecoms 99, the world's largest telecoms conference.

The company plans to integrate GSM-based, wide-area voice and data coverage with local technologies like DSL and Bluetooth to provide global communication. Devices utilising GPRS (General Packet Radio Service), also known as GSM IP, are the first step to a goal of offering fast, wireless Internet access in addition to voice calls.

Nokia displayed three reference designs for devices that will use the new technology. As well as a 'traditional' phone with a numeric keyboard and small display there was a design that took the communicator concept a little bit further, with a landscape display and touch-screen input. The third design sat midway between the two, with a portrait screen but no keyboard.

The third generation phones would use EPOC, the operating system from Symbian, WAP (Wireless Application Protocol) and Bluetooth for short-range communications.

Nokia also had something new for the network operators. The UltraSite is the first triple-mode transmitter available, combining GSM (the current standard) with EDGE and WCDMA technologies that will help provide greater mobile bandwidth. The flexible base station can accommodate all three technologies in various combinations, allowing for incremental rollout of the new standards based on consumer demand.

Also showing was Nokia's wireless local area network, based on the 802.11 standard. This provides Ethernet access with no physical link, over a large area at up to 11Mbit/sec. Connection to the network is via a simple type II PC card and the system can even cope with a roaming user, walking across the office with a laptop for instance, without dropping the connection.

RIGHT: Design for a mobile with graphical interface
BELOW LEFT: Concept video link

Software support is currently only available for Windows 98, NT and CE 2.11 or greater – and not EPOC. The technology is primarily aimed at large corporates, there were suggestions that it could be supplied to hotels and airports, providing simple web and email access to workers on the move. It will be available early next year. **WILL HEAD**

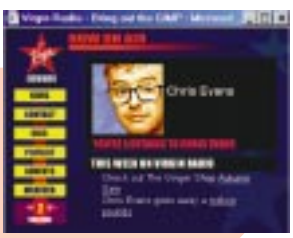
WWW.NOKIA.COM

Battle of baffling freephone net offers

Cheap Internet access deals grew in number and complexity last month as service providers fight to win and retain customers.

News that shares in Freeserve, which launched the battle with its fee-free service last year, had fallen below their float price added an edge to the competition. It reflected uncertainty over Freeserve's ability to retain or even to capitalise on its 1.3 million users.

Freeserve, itself now under pressure from freephone access offers, launched a deal allowing users to accumulate up to 10 hours of toll-free access a month. AOL, which has just launched the fee-free service Netscape Online, countered with a flat-rate, 1p-a-minute phone charge for the 600,000 UK users of its £9.99-a-month, paid-for service. Unlike most such offers, it is not restricted to off-peak times.



Always-on and freephone links make radio net services viable. Virgin Radio is targeting this new audience with what it calls a GIMP, which acts as a PC window on its programs.

Line charges of up to 4p per minute are seen as the biggest barrier to greater Internet use in Britain. AOL's UK managing director Karen Thomson said the new flat rate was a significant step in reducing the barrier.

Meanwhile, service provider FreeCall offered unlimited freephone off-peak access to users who top a threshold of paid-for use. And users of screaming.net, which started the freephone bonanza, complained that the company was still cutting users off after two hours of toll-free access – though its site still claimed this was a timeout triggered by two hours of inactivity.

How these various offers measure up depends on how much you use the Internet, how big your phone bills are and where you call to, and difficult-to-quantify factors such as quality of service.

Telinco, another cut-price pioneer, warned that freephone calls had to be paid for in some way, and this was being done by tying users unneccesarily to complicated tariffs.

A company statement said free unmetered access could increase Internet use dramatically, 'but will only succeed if the customer proposition is simple.'

Running parallel to the sign-up battle is one for content, with providers launching services such as chat rooms, financial deals, games and music in a bid to become a preferred first call for users when e-commerce takes off fully.

www.0800connect.co.uk; www.freeservce.net; www.aol.co.uk; www.telinco.net

net shorts

GREY EMINENCE
A new site edited by *PCW* ex-editor Ben Tisdall has become one of a small number to target the growing number of older Internet users. Vavo-com, the idea of Richard Spinks, former business development director of Lycos Bertelsmann, is designed for UK 45-year-olds, an estimated 13.6m of them, controlling 80 per cent of the wealth. Among the attractions is an easy-to-use, do-it-yourself website kit.
www.vavo.com

GIFT EXPRESS
The web is increasingly the first resort for anyone who needs to buy a present quickly for a forgotten birthday or anniversary. The latest site to target this market sells gift vouchers for a wide variety of high street shops. It's at *www.voucherexpress.com*

SECOND-HAND PCS
Refurbishing specialist Frazier International launches an online auction site this month to sell used PC and peripherals such as DVD players, hard drives and graphics cards, as well as PCs, notebooks and printers. The site has been running as a pilot since January and is expected to be ready for business this month.
www.lot1.com

PET TEACHERS
Did a teacher change your life? If so, you may wish to vote at a teacher's Hall of Fame at *www.teachersupport.org.uk*. **Closing date is 30th November.**

Cutting the ties to your desk

Intelligent surfaces can allow mobiles to be linked into a network – simply by placing them in any position on a desk, research at Cambridge University has shown.

The system could even link up a pocket device through your trousers when you sit down, researchers say – only half in jest. Unlike other types of wireless link, it can pipe power as well as data.

It relies on a programmable grid of contacts that can be laid onto a surface like skin (complete with nerves). The base of the connecting device carries the contacts – say two each for data and power.

Spacings are such that, whatever the orientation of the mobile, each contact can make only one connection with the grid. The system can figure out for itself how each contact point should be used, researcher Frank Hoffman told a conference at the university's department of engineering.

The smart surface is one of several rather eerie experiments in advanced networking environments being carried out at Cambridge's Laboratory for Communication Engineering (LCE), which works closely with the nearby AT&T (formerly Olivetti) labs.

The latter pioneered the use of Active Badges, a mini-cellular network which lets you stay logged into a network as you walk through a building. The lab has used today's larger bandwidths to extend the idea to a video link which would allow, say, a hospital consultant to stay in visual contact with a critically ill patient or operation as he walks around wards.

The system, which involves tracking every movement its target makes, is an application of what Andy Hopper, professor of communications engineering, calls 'sentient computing'. This provides computers with an equivalent of the models our brains use to negotiate the real world.

While Hopper includes 'feeling' in his definition of the word sentient, he stops short at the implication of awareness. 'I know of no program that can simulate consciousness,' he said.

CLIVE AKASS
www-lce.eng.cam.ac.uk

Tripping the light fantastic

Pictured here is a test-bed for an amazing device which uses configurable holograms to switch an optical signal. Exotic new switches like this are needed to exploit broadband optical data pipelines to the full.

First-generation devices translate optical signals into electrical ones for switching purposes, and then convert them back again. This relatively slow process amounts to a bottleneck in fast data pipes.

The new device is the culmination of two years of research by a team led by Professor Bill Crossland at Cambridge. He demonstrated the principle by shining a pencil laser through a fixed hologram to produce a clear grid of dots on a wall.

The switch his team has produced is at the top left of the pictured board – the bit the optical fibre is plugged into. It

consists of a ferroelectric, liquid-crystal layer, modulated by a mini-pixel array the size of those used in virtual-reality headsets. The array is controlled by a PC to produce the holograms needed for different switching patterns.

The prototype shown can switch a single fibre between eight other channels, but work is under way to show that the technology can be used to switch many channels between many other fibre channels. This would allow fibre switches to be built with the same capabilities as existing electrical switches.
www2.eng.cam.ac.uk/rose1.html

Online shopping swings

One-in-10 Internet users regularly shop on the Internet, according to a Which Online? report conducted by Mori.

Computer products accounted for the majority of online purchases in 1998, but these have now been superseded by books (13 per cent) and flights and holidays (12 per cent).

Fifty-eight per cent of those who have been online for more than two years have bought something online, compared with a quarter of those who have connected within the past year.
www.which.net

A holo victory ...

You should stop and take a breath as you hurtle towards the millennium with headloads of get-rich-quick ideas for the Internet. There are others out there who are putting all their energies into hi-tech products that are going to change our lives off-line too.

HoloTag is a young Cambridge company whose data-tagging expertise could put pay to all that queueing in the supermarket. It could also help protect brands and keep an eye on products. One use for its data tags is to keep track of goods in computerised warehousing associated with the distribution of goods bought over the Internet.

It is a technological spin-out of Sentec, a company specialising in sensors, magnetic and otherwise. Sentec

developed two generations of magnetic multibit data tagging technology and worked in the field of retail anti-shoplifting (EAS) for more than eight years. HoloTag has developed a label which uses layers of magnetic material in different orientations to store information. The sequin-sized 'smart' memory tag is recognised and read using a rotating magnetic field. HoloTag is in negotiation with multinationals about future concepts with a view to licensing its reader technology.

For the long-term (or sooner if it can get funding), HoloTag has its eye on the multi-million pound retail market with data-tagged shopping passing through its all-encompassing tunnel reader. It has also developed a handheld model as well as a version for monitoring products on an assembly line.

Right now, though, it is hoping to clean up the process control side of large corporate laundries where there is a demand for a method of cutting back on the millions of pounds worth of laundry that goes missing each year. This is apparently a serious problem for large hotel groups. The same tracking device can identify where goods are in a delivery process.

Final trials of the laundry system have been completed. At this stage its robust little tags can be sold to laundries for 30p each – a lot on, say, the price of tin of beans but a tenth of the cost of rival laundry tags.

'What we have done is create a system where every item has a unique identity, so that a company knows exactly how many items it has, where they are, and whether they are real,' says Melinda Rigby, HoloTag's dynamic managing director. 'What we need now is funding to get us into producing the high volumes the market needs, lowering costs.'

She believes that the technology, which is compatible with existing electronic-management technologies, is well positioned to be picked up by the retail market. 'Y2K trends associate a massive new investment by retailers in new electronic reading technology and there is a wave of interest in us forming the de facto standard in reader technology.'

www.HoloTag.co.uk

Caroline Swift ***reports from Silicon Fen***

Voice data hits monopolies

Major telephone companies are still locked into 'arcane monopolistic practices', says a leading telecoms analyst.

Voice over IP (VoIP), which lets you use the Internet to ring Timbuktoo for the price of a local call, bypasses some of these practices, which is why it works out so cheap, says Ovum's principal consultant John Matthews.

But oddly it is the 'carriers', the companies that charge huge sums for the use of their lines, who stand to benefit in the long run.

The price advantage to users of VoIP will erode in time, as carriers move away from traditional 'circuit-switched telephone lines, towards integrating voice and data on a simple network.

Carriers can make great savings by integrating their networks, because packetised IP uses lines far more efficiently than circuit-switched connections – which dedicate an end-to-end connection to each call.

Some corporates have already integrated their networks in this way, but they are in a position to guarantee connection quality.

The quality of a VoIP cannot be guaranteed on the wider internet, which was not designed for time-critical multimedia data. 'IP must be reworked if it is to be an ubiquitous carrier protocol,' says Matthews.

'The timescale for these changes is real and they will happen. Some of the best minds in telecoms are working on these issues right now,' he says. Yet phone companies are still buying traditional circuit switches and few are preparing for the change.

Matthews says it is in the big operators' own interests to move to an IP-based phone network, as this would allow smaller players to boost and encourage broadband use.

www.ovum.com

● *See Point of view page 28*

PC users can use Voice over IP to call any phone in the world, using a new system from a company called Callserve. Normally you need a PC at each end of a VoIP call. But Callserve uses high-quality links to carry calls to overseas centres, where they are rerouted at local rates. Per-minute charges to the US work out at 3p. A free client is available from *www.callserve.com.*

Visio takes the Gates shilling

Microsoft has entered the diagramming and technical drawing market – typically by buying its way in with the $1.3bn purchase of Visio.

The companies, both based in Seattle, have long had a close relationship. Visio's drawing products, aimed mainly at people who are not drawing specialists, have long been tied closely into the Windows environment and were among the first non-Microsoft software to support Visual Basic for Applications.

Microsoft will retain the Visio brand and plans to market the products as

complementary to the Office suite. Visio products have been bundled with Office in the past.

The move comes as Visio faces renewed competition from Autodesk, which publishes the de facto standard high-cost professional drawing package AutoCAD. AutoDesk has launched a number of products challenging Visio's core markets.

Visio, which pioneered the idea of smart shapes to facilitate drawing by non-specialists, has also been pushing up into AutoCAD's market.

Microsoft has a long history of buying in core technology, starting with its very first operating system. It got into routing software by buying the UK AutoRoute developer NextBase; but a bid to buy Intuit for its personal finance software was blocked by regulatory authorities.

Visio's chief financial officer Steve Gordon said the current deal was not likely to have similar problems as there was 'no product overlap.'

VNU NEWSWIRE

short stories

MICROSOFT EYES OPEN SOURCE AS LINUX BOOMS

Linux will become second only to Windows 2000 as the most popular server operating system by 2001, according to a senior IDC analyst.

Tony Picardie said the prediction was based on data from users, not from download figures. 'Open source software is a serious business,' he said. 'People are making a living out of supporting this.'

Meanwhile Microsoft's purchase of Unix house Softway Systems, which has done work on Linux, fuelled speculation that it is dipping its toe into open source.

XEROX BUYS TEKTRONIX

Xerox, a major seller of mono and heavy-duty company printers, has bought the colour printing and imaging division of Tektronix.

The $950m deal gives Xerox around 30 per cent of the office colour market, putting it second to Hewlett-Packard's 50-plus per cent.

It came as Xerox launched its DocuPrint C8 colour inkjet in the UK. Targeted at the entry-level market, it costs a recommended £89 ex VAT.
Xerox sales 0800 454197

HIDDEN SECRETS

Husbands, schoolboys and paranoid workers who surf mucky sites can remove all trace of their activities with the latest version of Surf Secret. It erases the easily-read trail of pictures and text left on your hard disk, but not a guilty conscience! SurfSecret 2.0 for Windows costs $29.95 from *www.surfsecret.com*

APPLE iBOOK SHIPS

Apple's new iBook laptop, should be available in the UK by the time you read this at a price of £1,024 ex VAT. *www.apple.com*

Digital Video Interface revealed

After much squabbling over rival designs, DVI has finally been accepted as a standard

PC users and buyers, who are just beginning to accept USB as a replacement for the venerable parallel and RS232 serial links, are now going to have to get used to another new port.

The open Digital Video Interface, revealed at the Intel Developers Forum (IDF) in Florida, seems to have been accepted as a standard, after a lengthy squabble over rival designs.

As with USB, there will be a transition period during which old and new are mixed – DVI needs only a cheap simple dongle to link to common legacy devices.

IBM, for instance, bundles one of these dongles with the DVI-enabled Savage4 Xtreme graphics card it bundles with its latest PC 300 GL desktop systems.

The old analog VGA port is not an efficient way to feed digital flat-panel displays – the digital signal has to be converted to analog and then back to digital again.

The effect on picture quality is quite noticeable, as Nokia showed recently, at a press briefing by display vendors, when it fed the same picture via digital and analog feeds to two of its latest 18.1in 800 Pro LCD panels, which can take either.

Viewsonic was the only vendor to show a digital-only model, a version of its VP-150. These digital-enabled models all use the older DFP link, which again can link to DVI via a dongle – they will soon boast native DVI.

The DVI spec was drawn up by the Digital Display Working Group (DDWG), and launched by Intel, Compaq, Fujitsu, HP, IBM, NEC and Silicon Image. It employs the Transition Minimised Differential Signalling (TDMS) interface used by some current systems, but with a new plug.

Among the first displays to use it will be analog cathode-ray displays. The digital signal will be converted within the unit rather than on a graphics card as at present – this allows designers to optimise performance for their display. Entry-level monitors are likely to stay analog to keep prices down.

Chipsets on graphics cards generally integrate digital-to-analog conversion, but vendors do not seem bothered by the changes and are already beginning to adjust. Matrox has just announced a DVI adaptor for its latest G400 accelerator.

Early DVI monitors are expected to cost up to 15 per cent more than analog-only models, a premium that is expected to vanish within a year.

DVI can theoretically carry any data at up to 3.3GB/sec (using dual channels). DDWG representatives did not dismiss the possibility that DVI could be used to link high-definition TV sets and set-top boxes – an interface many thought might be 1394.

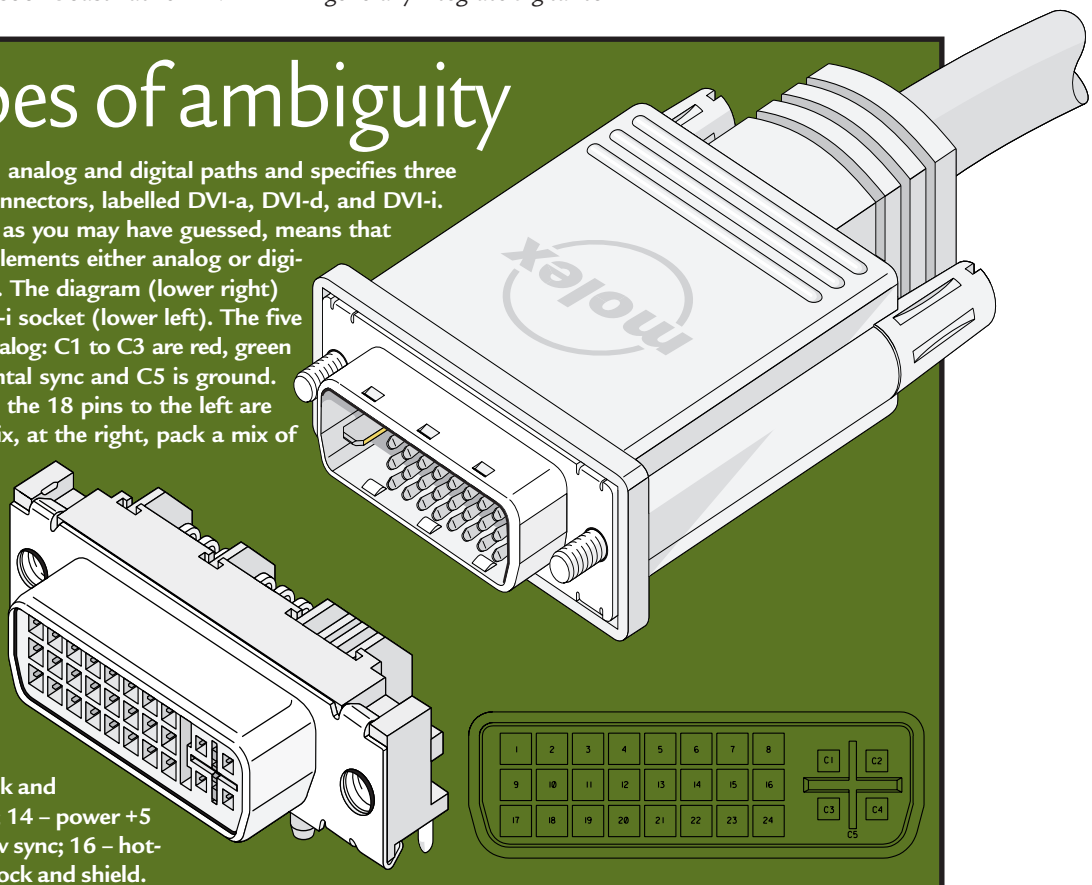
Clive Akass in London and Gordon Laing in Florida

Three types of ambiguity

DVI packs both analog and digital paths and specifies three types of connectors, labelled DVI-a, DVI-d, and DVI-i. The suffix, as you may have guessed, means that the respective connector implements either analog or digital or both (i for integrated). The diagram (lower right) shows the pinout of the DVI-i socket (lower left). The five pins to the right carry only analog: C1 to C3 are red, green and blue video; C4 is horizontal sync and C5 is ground.

In the other 24-pin block, the 18 pins to the left are digital only. The remaining six, at the right, pack a mix of analog, digital and common functions and feature on both a-type and d-type links. You can see this on the DVI-d plug (top), note that this uses pin C5 as a locator.

In more detail the left-block pins are: 1-5, 9-13 and 17-21 – data and shield connections for two TMDS channels; 6 and 7 – DDC clock and data; 8 – analog vertical sync; 14 – power +5 volts; 15 – ground, analog h/v sync; 16 – hot-plug detect; 22-24 –TMDS clock and shield.



Intel is to kick off the millennium with the launch of the 64bit Merced processor.

Glimpse of the 64bit future

The bi-annual Intel's Developer Forum is becoming an essential venue for IT analysts and journalists. This year I joined more than 2,500 participants there.

The first keynote was given by Intel's head honcho Craig Barrett. He was described by desktop products vice-president Pat Gelsinger as a ruthless dictator, yet he explained rather humanly how he couldn't get the images off his new digital camera nor install a screensaver on his wife's notebook.

The moral being that current PCs are not easy enough to use. It was driven home in a presentation by Gelsinger on the EasyPC initiative which aims to simplify and speed up every aspect of consumer IT.

Barrett described all future homes as eHomes and businesses as moving to eCommerce – citing estimates that 10 per cent of the US GDP will be generated through online commerce by 2002.

Rather more interestingly he revealed that Intel would deliver its first 0.18 micron Coppermine Pentium III processors as soon as October, hinting that one had a seven at the beginning (best guesses are that the first will run at 667 MHz and 700MHz, the former avoiding the number of the beast).

▲ CRAIG BARRETT – HIS REPUTATION PRECEDES HIM, AND DECEIVED US

Barrett was short on details of the long-anticipated 64bit Merced, due to ship next summer and clocking a likely 1GHz, but gave a first public demonstration of the silicon. It was shown briefly running 64bit Windows and Apache server under Linux, which sadly gave little indication of what 64bit Intel Architecture (IA-64) will be capable of – that will happen only with applications optimised for running 64bit native.

One of the IA-64 team said 32bit apps which made plenty of disk and memory calls could benefit greatly from running on IA-64 and a 64bit operating system. Otherwise Intel played down IA-64 as a 32bit replacement and seemed keen to position it for servers and serious business (although when I said I'd buy one if it ran Photoshop and Quake faster than a PIII, our IA-64 man looked happier than he had all night).

Pat Gelsinger demonstrated an 800MHz PIII, and mocked alternatives which need additional cooling. This was a bit unfair on AMD, as Intel's 800MHz PIII is a 0.18 micron part with no shipping date or price.

Gelsinger described the PalmPilot as the only successful non-PC IT product, and claimed the PC would continue to be the best Internet-access platform. Pressed on the subject, mainly by Europeans, he totally dismissed games consoles and mobile phones as a threat.

(I'd agree they are far from competing with the richness of the PC experience, but among connected devices in Europe they outnumber the PC by four to one. People are satisfied with the basic cashpoint interface and would be more than happy to see it transferred to mobile phones for making similar transactions.)

I asked Gelsinger how he felt about overclocked and multi-processed Celerons (*PCW*, October, p58). He replied that Intel designed and guaranteed products for a specific environment, but customers were free to do what they liked with them. 'You could prop a truck up with a Celeron if you wanted,' he said.

He also said the launch of 0.18 micron PIIIs increases the gap between PIIIs and Celerons, the performance of which are currently close.

GORDON LAING

Geyserville kicks in at 600MHz

Frank Spindler, Intel's director of mobile marketing and all-round nice guy, said the first mobile Pentium IIIs (using the fine 0.18 process debuted in the 400MHz mobile PII) are imminent. They will launch at 500MHz rather than matching the fastest desktop chips.

Battery-saving Geyserville technology won't be included until the 600MHz Mobile PIII arrives in the new year – because that's the speed at which it starts to become effective, according to Spindler. We suspected the technology had been delayed.

Current mobile processors can double battery life by dropping clock speed from 500MHz to 250MHz – but they also cut performance by half. Geyserville allows the supply voltage to be dropped, and as power drain varies by the square of the voltage, a small drop results in big savings. Intel claims up to 40 per cent less power is needed, with little reduction in performance. Geyserville chips can match desktop performance when connected to the mains, but give a good innings under battery power.

S3 Savages mobiles

3Dfx and Nvidia (with its new G-Force 256-bit chipset) seemed totally focused on maximising desktop PC performance. However, this leaves mobile gamers siding with S3's new Savage Mobile chipset, which drew envious looks from passing ATi developers.

The Savage Mobile, with optional 4-16MB on-die memory, looked very impressive in Quake and motion-compensated DVD playback.

But a greedy ProAGP graphics card on a proposed IA-64 machine actually required its own power supply, making the future look grim for high performance mobile graphics chipsets.

Intel is to kick off the millennium with the launch of the 64bit Merced processor.

Faster USB threatens 1394

A question mark hangs over the future of 1394 as a fast mainstream PC link following a further boost in the specification for the next-generation USB link. The speed of the Intel-backed USB 2.0 spec has been increased twice this year – first to a maximum 240Mbit/sec, and lately to a speed of between 360 to 480Mbit/sec.

There is headroom in the cabling for speeds as high as 500Mbit/sec according to the USB 2.0 Group at the Intel Developers Forum, where the new spec was announced.

The compares with the current 400Mbit/sec of the non-Intel FireWire port, aka IEEE 1394. So could USB 2.0 be playing a numbers game?

High speed interfaces such as USB 2.0 have to be located carefully on motherboards, although the Group does not expect it to cost more than current USB ports. It also claims USB 2.0 is both backwards and forwards compatible with USB 1.1: that is 2.0 peripherals will work, albeit more slowly, on 1.1 ports; and 1.1 peripherals can be mixed with 2.0 units without perceptibly slowing the USB 2.0 bus.

This kind of functionality has taken the SCSI world years to achieve, although the USB 2.0 group is confident it can deliver systems and peripherals during the second half of next year.

Other developers believed USB 2.0 could be as long as two years away. The main sceptics were none other than the 1394 Trade Association, huddled in the corner of the show pavilion with the appearance of a small army making a last stand. They claimed that by the time USB 2.0 arrived, 1394 would have rates of 1.6Gbit/sec – although it has to be said that projected increases to 800Mbit/sec and 1.6Gbit/sec have been a long time coming.

Firewire's unique selling point is that it is a peer to peer interface which, unlike USB, does not require a PC or Mac to host the bus. However, apart from a new Asus P3B motherboard and Gateway notebook with built-in FireWire, the 1394 TA wasn't showing anything other than the same old DV Camcorder-to-PC digital-editing suite.

Another sign of how the wind was blowing was in the design of 'concept PCs'– ideas for models of the future (see below). Common to these were drives and devices housed in small boxes which could hot-slot in and out of large sockets as required; let's call them devices which sit in bays. These bays used only USB links; unlike the original Device Bay specification, which employed both USB and 1394.

Intel claims it's up to the market to vote for its preferred technology. However, I left the forum with a feeling that we may not see much of 1394 outside of Apple Macs and DV Camcorders.

Cooking up PCs for the kitchen

Intel showed off numerous concept PC designs, most of them small and aimed at traditionally IT-free regions of the home. There was the Vesta splash-proof kitchen PC, the Magic Bean's Kids platform and even Sozo Design's Ottoman foot-stool cushion PC.

All used the new compact FlexATX motherboards which measure just 9 x 7in. Cape Blanco's concept FlexATX motherboard featured a right-angled AGP slot to reduce volume further.

All new boards housed socketed Pentium III processors, and some pre-printed literature described them as using the Socket 370. This is the very same Socket 370 used by current socketed Celerons, so a current motherboard with a BX, 810 or 820 chipset should in theory be able to run future socketed PIIIs.

Bluetooth radio technology, designed to get small devices talking to each other, was much mentioned, but little demonstrated. However, we could ask questions about infra-red and competing radio technologies.

An IrDA representative urged notebook developers to continue fitting IR to their portables, citing higher speeds than radio and describing line of sight as a security benefit. During an enormously technical presentation, the effects of Bluetooth, IEEE-802.11 wireless ethernet and Home RF all working in the same room were discussed. Fortunately it would appear that short packet lengths and frequency-hopping allow all three to share the same space with only a slight reduction in overall bandwidth (known as graceful degradation).

▼ PUT YOUR FEET UP ON SOME SOFT WARES. PCS OF THE FUTURE COULD LITERALLY BECOME PART OF THE FURNITURE

The second coming

Tim Bajarin reports on Sony's PlayStation 2, a possible Trojan Horse for digital entertainment.

Last month I visited Tokyo for a week and had the opportunity to spend some time with top Sony executives, including chairman Nobuyuki Idei and Ken Kutaragi, who is in charge of PlayStation 2.

The first Sony PlayStation had yet to reach the market the last time I visited the company in Japan more than five years ago. Since then Sony has sold more than 60 million PlayStations worldwide, making it king of the gaming world. It has also entered the desktop PC market (although not in Europe) and came from nowhere to gain 50 per cent of Japan's retail laptop market with its Vaio range. Sony is becoming a force to reckon with in three contexts:

- A new Digital Studio line of Vaio desktops aims at the creative consumer market by packing high-end video and audio-editing features. This has gone down well with US power users who are starting to take advantage of the latest digital still and video cameras.
- The Vaio 505 ultralight laptop forced rivals to come out with imitations. Sony has followed the success with its new line of A4 laptops, using a clever hinge that increases airflow to help cool fast PII and PIII chips.
- The forthcoming PlayStation 2 has the potential to become the central control for digital entertainment in the living room and could morph into a critical component of the digital home of the future.

The PlayStation 2, besides having an amazing processor and graphics engine, has a great deal of expansion capability and should not just be considered a dedicated games machine. The media format used is DVD, so right away the unit can double as a DVD video player and CD audio player.

PlayStation 2 also includes two PC card and two memory card slots, as well as optical digital output, two USB ports, one IEEE 1394 FireWire port and two controller ports. A third-party vendor can thus create a browser, bundle it with a PC card modem, and turn the PlayStation 2 into a web-access device.

A cable modem with an IEEE 1394 link could also connect the PlayStation 2 to the Internet as well as to cable programming. And don't forget the two USB ports. Third-party vendors can now provide printers, scanners, and a whole host of other USB peripherals with the PlayStation 2, making it a very versatile digital entertainment system.

It could be the Trojan Horse that gets digital technology into the home, a task many believe will be performed by the digital set-top box or cable modem. But these cannot serve so many needs within the home entertainment system.

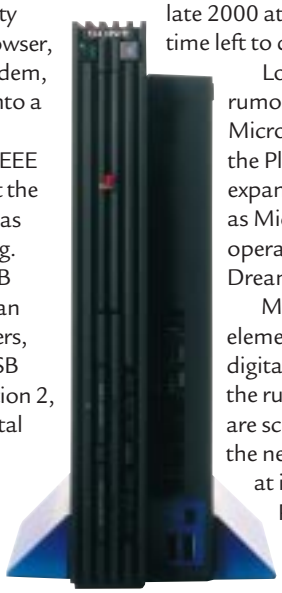
Sony will not have this space to itself. Sega's Dreamcast console has already set the game world buzzing, but it is limited by a lack of I/O ports for expansion.

I expected Nintendo to go to school on PlayStation 2 and try and make a version just as versatile. Of course, it will have to give up its proprietary cartridge model if it wants to really take a shot; but as it will not have a system out until late 2000 at the earliest, it has some time left to deal with this opportunity.

Looming in the wings is the rumoured 'game' system from Microsoft, said to be similar to the PlayStation 2, especially in expansion capability. This is ironic as Microsoft provided the base operating system for the Dreamcast.

Microsoft sees the game element as key to any home digital-entertainment system, so the rumours make sense. Details are scarce, but sources say that the new system will have Web TV at its centre. Like Sony's PlayStation 2, it will use the DVD media format.

As you can see from all the new activity in the gaming space, this is quickly becoming the real battlefield for consumer attention within the home. And, while Sony appears to have hit the sweet spot with its PlayStation 2 system, competition from Sega, Nintendo and Microsoft should make this home computing war very interesting in the days to come.



▼ ONE OF THE PLAYSTATION 2'S BIGGEST SELLING POINTS IS ITS POTENTIAL TO BE UPGRADED

Quark takes a stroll down the avenue

A belated Quark add-on should consolidate XML as the global file format. Clive Akass reports

Quark, the Microsoft of professional desktop publishing, has taken a belated step towards fully integrating traditional print into the world of interactive electronic media. It comes in the form of avenue.quark, an add-on to QuarkXPress, the package used (on both Macs and PCs) to publish most of the newspapers and magazines in Britain.

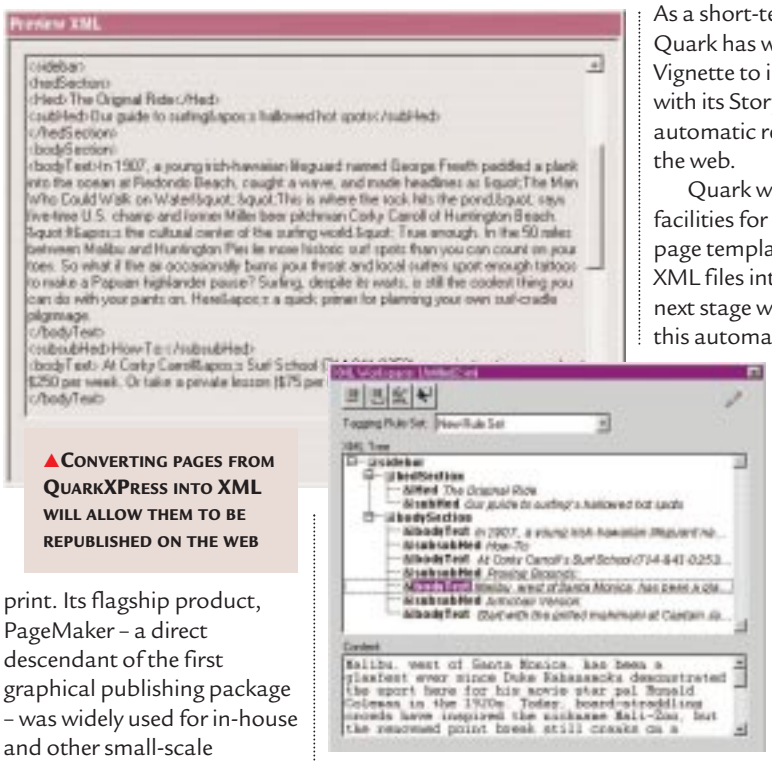
The add-on (or Xtension, in Mac terminology) translates Quark pages into eXtended Markup Language (XML) – which is taking over many tasks from the related, but more limited, web page description language HTML.

This may appear to be a fairly trivial task, but it has far-reaching ramifications and finally addresses a major problem that has faced print publications since the dawn of the web boom five years ago – how do you extract information from Quark pages for republishing on the web?

A bigger question is why Quark has not done it (or something like it) before? Quark freely admits to having been slow to latch on to the web, but points out that so was its biggest rival, Adobe.

However, Adobe did move fast when it spotted the trend, and quickly bought out a range of web products. One reason for Adobe's reaction could have been that it was not so locked into traditional print. Its flagship product, PageMaker – a direct descendant of the first graphical publishing package – was widely used for in-house and other small-scale publications, but had long ceded the mass-publishing market to XPress. This wasn't necessarily because Quark software was better. The industry simply gravitated to XPress for much the same reason it gravitated to PC architecture and Microsoft's operating systems: it needed some kind of standard.

This should have given Quark a commanding position when the need arose for web publishing packages. There seemed no reason why it should not simply adapt XPress, allowing its users to extend their existing skills to the web.



▲ CONVERTING PAGES FROM QUARKXPRESS INTO XML WILL ALLOW THEM TO BE REPUBLISHED ON THE WEB

Yet Quark Immedia, which aims to do just that, didn't come out until two years ago, by which time it was too late. Immedia, now in release 1.5, has hardly taken the world by storm, and Quark has no plans to develop it further. Instead, Immedia features will be incorporated into future versions of QuarkXPress (see boxout).

Quark has partly been a victim of its early success. So many publications have so much invested in its software that it has a virtual monopoly. No company facing the full force of competition could have gotten away with being so slow to adapt to change.

However, Quark does seem to have finally developed a sensible web roadmap, on which avenue.quark is merely an early milepost. But users are still left with the problem of what to do with the XML files.

As a short-term solution Quark has worked with Vignette to integrate avenue with its StoryTeller system, for automatic republishing on the web.

Quark will follow up with facilities for creating web page templates and flowing XML files into them. Then the next stage will be to integrate this automatic re-publication system with web servers.

But all this is transition software, adapting the old to the new, and for the long-term it really needs to be turned on its head. All of the big publishers are now multi-platform publishers, formatting the same material in several different ways – including having to format for the various display sizes found on the web. Therefore, XML, which is designed for just this purpose, is a more efficient starting point than the printed page.

So Quark, which sits on the World Wide Web Consortium's XML committee, will have to make the avenue.quark process bi-directional, allowing XPress to interpret XML files.

XML will become a defacto standard Quark file format, just as Microsoft Word has adopted HTML. This is bound to consolidate XML as the global information file format, which means that virtually all publishing will essentially become XML publishing.

Avenue.quark is expected to ship next spring. Details can be found at *www.quark.com*.

Future versions of QuarkXPress will export pages as HTML, says the company. This means full HTML support, with the page designed as much as possible in HTML. But many DTP packages that claim such support just add basic HTML tags, with no attempt to match the page design. The export will also support advanced features like wrapping text to a curve – but as HTML can't cope with such trickery, the result will be used in the form of a JPEG picture file.

BT offers freephone net PC deal

British Telecom is offering customers a PC and Internet-access package for just under 90p a day, over three years. The deal includes unlimited freephone Internet access at weekends.

The package, a joint venture with Fujitsu, costs £25.99 (inc VAT) a month. Access via BT Internet normally costs £11.75 per month so customers will effectively be paying £16.24 a month hire purchase for a 400MHz Celeron-based Fujitsu PC, local-rate support lines and home delivery.

The deal is targeted at novices and includes installation by a Fujitsu engineer who will offer a free tutorial. However, there is no trial period and the deal is covered by the same rules as a loan agreement – if broken the remainder of payments have to be made plus two months interest. Over three years the package costs £935.64.

'We did not feel a trial period was necessary as there is now enough on the Internet to keep any family happy,' explained a spokesperson for BT. 'Plus we are not just selling Internet access here, the PC today is capable of much more, including games and office applications.'

BT said it plans to build in some kind of upgradeability so customers are not stuck with out-of-date technology.

Details on 0800 800 001 or www.btinternet.net

JAN HOWELLS

Brilliant boxes

It seems the days of 'you can have any colour PC, so long as it is beige' have long gone. You can thank Steve Jobs for starting the trend with those flashy new Apples, but now other vendors are getting in on the act.

Dan Technology's new PCs come in a choice of shades, including Aubergine, Aquamarine and Grenadine. Prices (ex VAT) range from £747 for a Celeron 466-based Xplora Plus to £1,119 for a 500MHz PIII Home Studio.

Dan Technology 0181 830 1100

Powerline data plans get short circuited

A plan to use powerlines for fast data delivery has been scrapped in the face of emerging competition from ADSL and cable links.

Nortel and United Utilities created a joint venture called Norweb to exploit what it called Digital Powerline Technology (DPL). This pumps a high-frequency carrier wave down lines carrying low-frequency AC power.

Norweb hoped DPL would provide homes with Internet access at around 1Mbit/sec – 10 times faster than ISDN, but slower than ADSL's 1.5Mbit/sec. It believed costs would be lower because the mains network is already in place.

However, after three years of development, the investors concluded that the market had changed to an extent that did not justify the costs.

Nick Gibson, Internet analyst at Durclacher, said 'The economics just weren't right in what will become the highly-competitive consumer broadband market.'

DPL was criticised when it was first announced as being a likely cause of radio interference. There were reports of street lamps in DPL trial areas turning into radio transmitters, amateur radio buffs feared their bands would be swamped and the government's Radio Communications Agency was concerned about problems with military and emergency services.

Norweb dismissed these fears and insisted the decision to scrap the project was taken purely on commercial grounds. 'The product worked. We proved there was no interference,' said marketing manager Jane London. 'We conducted various trials with power utilities in Europe, so we proved the technology works, but it was perceived by the parent companies as too niche to make money out of,' she explained.

ANGELA SOANE

Microsoft gears up for a direct hit

Microsoft has released its DirectX7 programming interface, which is designed to help developers of games and other applications to use advanced 3D graphics and sound effects, as well as giving a significant performance boost.

According to Microsoft, DirectX7 produces faster code, which means it boosts application performance by up to 20 per cent over DirectX6.1.

Notably there is increased support for dedicated 3D accelerators, which free the main processor to do other calculations. It supports environment mapping for visual effects, such as reflections in water or light passing through a stained-glass window.

And for the first time DirectX is open to Visual Basic developers, who are provided with sample code and helper controls.

The DirectX7 kit can be ordered from www.microsoft.com/directx/developer/downloads/default.asp.

Scare wars: episode Y2K

Predictions of patent-pending, demo viruses dismissed as hot air.

Anti-virus software vendors, who have a long history of slanging matches, have been at each other's throats again – this time over allegations of scaremongering.

UK-based Sophos accused arch-rivals Symantec and Network Associates of hyping the threat from rogue code. It cited a claim by Symantec's chief researcher that up to 200,000 new viruses might be written especially for the millennium.

Sophos said confusing statements from anti-virus companies trivialised the problem and damaged the credibility of the industry at a time when many businesses were deeply concerned about the date-change issue.

Graham Cluley, Sophos' senior technology consultant, commented: 'Predictions of this type are unhelpful. We are surprised to see anti-virus companies trying to capitalise on Y2K worries.'

Sophos accused Network Associates of warning on its website of the threat from viruses that are not in the wild and are never likely to be. (Some viruses are developed and stored as proof of concept. The original macro virus appeared to have been just such a demonstration, but 'escaped' to become one of the fastest-spreading ever.)

Symantec's technical director Kevin Street said its research chief's comments had been taken out of context. 'What he meant was that there could be between one and 20,000 new viruses, but the numbers aren't what matter. What matters is that we are prepared.'

He added: 'There will be a great temptation for virus writers to write the first Y2K virus to get the attention.'

David Emms, product manager at Network Associates, said information was posted on its website 'because people are concerned'.

He added: 'We don't know exactly what the numbers of viruses will be yet, but it is most likely that virus writers will tack on to Y2K because of the date.'

A virus has been attached to hoax emails purporting to come from support@microsoft.com, Microsoft says. It warns that the file called Y2Kcount.exe should not be opened.

Separately, Network Associates said it has placed a medium risk assessment on the Suppl Word macro virus that has been posted to 25 alt.sex newsgroups.

JO PETTIT

Tough and ready

Panasonic has hardwired GSM radio into its latest rugged notebook, adding further evidence that wireless links are starting to supersede the plug-in modem. The ToughBook 27, designed in conjunction with Vodafone, is the newest member of a range designed to withstand rough handling.

A 226 MMX-based version with a 4GB hard drive, 32MB of RAM, and a 12.1in TFT colour screen costs £3,699, including a three-year warranty.

Panasonic 0500 404041

IBM ponders Linux port to IA-64

IBM has refused to confirm speculation that it will join a consortium porting Linux to Intel's emerging 64bit architecture (IA-64).

HP, SGI, Intel and Cygnus are among those working on the Trillian project to make the open source code available when Merced launches next year. IBM, SCO and Sequent are working on a common version of Unix for IA-64.

Jonathan Prial, director of integrated solutions and Linux marketing for IBM, said that the two projects were targeting different markets and he refused to give a date when IBM would join Trillian. But he reiterated 'IBM's commitment to complete Linux solutions', suggesting that IBM may join Trillian.

Andy Butler, Gartner Group analyst, said: 'The maximum market opportunity for Linux is and will be on Intel. Linux delivers the most reliable operating system on Intel.'

LISA KELLY VNU NEWSWIRE

Gordon Laing warns that there are more differences than you might think between ISPs.

Variety is the IPSpice of life

It's an indication of how the consumer IT market's developing that the second question any new buyer asks after what system should they purchase, is which ISP they should sign up with. My friends and family ask me all the time, and while I can wax lyrical about which hardware configuration currently represents the best value for money, I tend to stumble on the old ISP question.

The trouble is that ISPs can be so variable. Lesser-known providers may rarely be engaged, but once popular, will demand outstrip supply? Then again, is it fair to compare complaints made against larger ISPs when statistically they're going to have more problems?

You'd be fair to ask who I use for internet access and, unsurprisingly for anyone who knows me, the answer's ever so convoluted. Technology for technology's sake I say. Right, here goes: in the UK I use Demon Internet as an ISP and outgoing SMTP mail server, but not as an incoming email provider. Not that there's anything wrong with Demon's POP3 service, er, apart from that recent hitch where its mail server refused to talk to anyone for a few days.

No, my POP3 mailbox is provided by EasySpace, an American-based company which also hosts my glnow.com website – EasySpace registered it with Network Solutions too. So I dial up Demon, which connects me to the internet and in turn to EasySpace's POP3 mailbox. Demon looks after the outgoing SMTP mail, and everything's hunky-dory.

Well, until I go abroad that is. Like so many UK ISPs, Demon does not offer access outside the country unless you can wrangle a non-0845 number out of it and are happy to suffer international call charges. You can always access any POP3 mailbox by entering your details into various websites such as Hotmail and Excite, but you'll still need an ISP to get there, and web cafes are not always readily available.

I recently discovered a solution with Pipex Dial. With UUNet behind the scenes, Pipex boasts local points of presence to dial around the world. When abroad, dial the nearest local access number and enter your account username and password as usual. You will need to enter UUNet's country-specific SMTP server to send email, but your incoming POP3 details can remain the same.

Brilliant, even if Pipex does charge a few quid for the privilege of roaming – there are more details in this month's *Hands On* Hardware column of my wandering ways. Oh, and PDA users needn't be put off by Pipex's site claiming you need their Windows client software – just type your account details straight into the relevant control panels.

But the reason I'm telling you all this, is that over the past few months of being slightly more demanding of my ISPs, I've discovered a wealth of differences between them. Let me tell you for one thing that not all web space is created equal. There I was happily testing Sharp's Internet Viewcam, a tiny gadget that captures video, compresses it into web-sized portions, and even formats it into streaming media so that visitors to your site don't need to download the entire thing first. Great stuff, but when I uploaded video onto EasySpace's server it suddenly didn't want to stream any more. One technical enquiry later and I was informed EasySpace did not currently support any streaming media on its servers – and it turns out this is not uncommon, so anyone interested in Real Video, Microsoft ASF or Quicktime had better look closely at their ISP's specs.

There are rules against that too: NO DATA ALLOWED that does not directly pertain to your website – I've had stuff removed

So what precisely was I supposed to do with my 100MB of free web space? My website already contains a disproportionately large number of photos. They may be heavily jpeg'd, but there are hundreds of them – and you know how big my entire site measures? 5MB on the button. Hey, maybe I could use the other 95MB as secure off-site backup. No, hang on, like every other web-space provider, there are rules against that too: no data allowed that does not directly pertain to your website – I should know, I've had stuff removed that wasn't actively participating. Kind of makes a mockery of those ISPs that generously offer unlimited web space, doesn't it?

You know what? I'm going to create a 95MB tif of me with my tongue sticking out and upload that to my web server, complete with an active link from the homepage – you will come and visit, won't you? Even using my scorching 32Kbit/sec '56K' access at peak rate, it'll be the most satisfying £16 I've ever spent.

gordonl@pcw.co.uk

When it comes to ozone detection, the best advice is to follow your nose, says Barry Fox.

Something in the air

'Did you know,' asks a company that has started selling a strange-smelling device like an air-freshener, 'that ozone is a toxic gas emitted by electrical equipment found in most offices, such as photocopiers, fax machines, computers and laser printers, and can cause respiratory difficulties when inhaled?'

Thereby hangs a whole string of tales.

First, forget the old idea that ozone is good for you and there is a lot of it by the sea. What you smell on the beach is usually rotting seaweed. Ozone is an unstable form of oxygen (O_3 instead of O_2), generated by electrical sparking, high-voltage discharges and ultra-violet light. It has a pungent but sweet odour, and this is often dubbed the 'smell of electricity'.

Ozone acts as a powerful bleach and disinfectant. Twenty years ago ozone-generators, with a UV lamp, were sold as home air-cleaners. Then people got wise to the fact that although ozone is a good thing in the upper atmosphere, where it shields us from the sun's ultra-violet radiation, it is a bad thing to have in the home or office. The bleach reaction harms the eyes, nose and throat, and triggers allergies.

Around 10 years ago the world woke up to the fact that laser printers and copiers could produce ozone as they relied on high voltages to make the toner powder stick to a print drum, before its transfer to paper. A thin corona wire carried around 7,000 volts and generated ozone.

Although printers and copiers were usually fitted with filters, containing activated carbon, to break down ozone, they clogged with dust and stopped working. Changing the filter was a tricky job, and seldom explained in the manual. The manufacturers did a rotten job of communicating the risks and remedies.

Offices in Denmark were first to play safe, with external filters fitted to existing machines. Dansk Teknologi of Copenhagen started making its Minozon unit in the summer of 1988 and sold 8,000 in the first year. In 1990 over 40 per cent of the laser printers in Denmark had add-on filters. The Minozon was a large, flat, metal plate containing a big bed of activated carbon. The printer sat on top, connected by a flexible tube. It cost nearly £500.

Japanese company Canon has always made the laser 'engines' used in most western-brand printers, including those from market leader Hewlett-Packard. In 1990 Canon redesigned its system to reduce ozone emission and make filters unnecessary. Instead of a corona wire, the engine has a charge transfer roller. A long, thin roller, made of electrically conductive rubber, presses hard against the drum surface and transfers the high voltage charge without generating ozone. Kyocera also switched to a roller system.

Only very large office machines still use a corona wire, and they are usually serviced under contract. So the Minozon filter was largely redundant by the time it was launched in the UK.

Now, after some production delays, Atmospheric Solutions of Gloucestershire has launched an L16 freshener pad that is soaked in 'natural oils' to get rid of ozone. The British Allergy Foundation (BAF) has given Atmospheric's Nozone its Seal of Approval and Professor Robert Davies, president of the BAF, says it is 'highly effective'.

But is it necessary?

A transfer charge roller engine emits only two parts of ozone per billion (ppbn) of air. Natural clean air contains at least 25 ppbn. Paul Burwood, Hewlett-Packard's UK marketing manager, says: 'There is no health hazard from an HP Laserjet printer'.

People are able to sense concentrations of 10 ppbn, ONE TENTH THE LEVEL at which humans feel irritation in the eyes, nose and throat

Stuart Maxwell, technical director of Atmospheric Solutions, says there is 'plenty in the literature' but could only cite one article which quantifies the ozone output from copiers. And that was published in 1983. 'But there are still plenty of older machines in use,' he warns.

The tests run with the BAF relied on an ozone generator. Davies was unaware of the sweeping changes made in engine design and acknowledged: 'We don't know what the levels are in offices.'

The best test remains smell. When they walk into a room most people will be able to sense concentrations that are below those at which the eyes, nose and throat are irritated.

If you have an old personal laser printer or copier and can smell it when it is printing to paper, then try a Nozone. If you work in an office with a big machine that smells, ask the boss to get it serviced or buy some Nozones. The cheap fix is to stick the offending beast by an open window.

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The Java office revolution hasn't happened, but the OS still has its niche, says Brian Clegg.

How do you take your Java?

How do you take your Java? That's a question many companies have been re-examining over the last year. Inspired by that classic duff film title, *Krakatoa, East of Java* (Krakatoa is actually west of Java, but when did those people in Hollywood pay attention to facts?), I can't help but wonder if the Java world is in need of a Krakatoa-like eruption to revive interest. The big IT success story of late has been the magnificent Linux, not Sun's linguistic baby.

In case you live in a Java-proof bunker, the topic here is not the place, nor the coffee, but a computer language from the workstation manufacturer Sun. Java is not dissimilar to the widely used professional language C++, but has a unique attribute. It operates in a 'virtual machine', effectively a language interpreter that separates it from the workings of your computer as a whole. In theory, a program written in Java will run on any computer with a Java virtual machine, whether it's a Unix workstation, a Mac, a PC or a PDA. This concept was crucial for Sun, as a move to Java products could break Intel's stranglehold on the desktop.

I don't think this will involve Java. Most people don't want to ROLL THEIR OWN, they want to take something off the shelf and use it

In the heady early days, Java seemed ready to conquer the world. Larry Ellison, supremo of database giant Oracle, felt he had the weapon he needed to triumph against the Dark Side – Microsoft and Intel. The future, he trumpeted, was NCs (Network Computers) not PCs. These devices would not store anything locally, downloading programs and data from a network. Instead of Unix or Windows, they would run JavaOS, a new operating system optimised for Java. This would be great for businesses, Ellison argued, as it meant a return to centralised control. There would be no need to install the latest Office suite on 10,000 PCs – you just have to pop it on your servers and *voilà*. What's more, centralisation would protect data, because no-one backs up their PC.

The other big name rivals of Wintel saw an opening too. Memories arose at Lotus of when the company was queen of the spreadsheets, while WordPerfect (now part of Corel) pined for its place at the top of the word processing tree. Both announced office suites using compact Java components that could be downloaded when required. Java was to be a route for the downtrodden business community to regain control from Bill Gates and his monolithic monsters.

Almost immediately we saw some neat little Java applications. We just had to wait for the serious programs to be developed. And wait. And wait. Every now and then a prototype Java office suite would emerge. But it would have little more functionality than a freebie like Wordpad, and would run painfully slowly. Even Sun's recently acquired StarOffice, impressively cross-platform though it is, isn't a Java application (though admittedly the next version is intended to be). And strangely, Mr Ellison did not have hoards of customers rushing to abandon their flawed but workable PCs for NCs. Sun and IBM recently dropped development of the JavaOS operating system at the heart of these devices.

This is not to say that Java is a failure. It is being used for small portable programs and web applets. It will be increasingly used in internet devices from webphones to set-top boxes. The Java-derived JavaScript has wiped the floor with Microsoft's alternative as the standard for web scripting. But the Java office revolution hasn't happened. There is still hope, though, for those who are fed up with the current ungainly Office suites. There will be big developments in the next few years, but as always with computing, the direction is likely to take us by surprise.

What we can say with some certainty is that it will involve changes that make it possible to undertake your office tasks quickly and (most importantly) intuitively. I don't think this will involve Java, or components you have to assemble yourself. Most people don't want to roll their own, they want to take something off the shelf and use it. We're more likely to see programs that learn how you work and what you want to do, then reconfigure themselves, pulling in and discarding components to meet your needs. After all, most of us use computers to get our jobs done, not to play with software.

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Paul Smith wants to know if having a website and a baby counts as having twins.

Parental concerns

They say that looking after your website is a bit similar to looking after a small baby, needing almost constant attention and a level of care unimaginable to those who haven't yet experienced it.

This, of course, is the big surprise that comes to all those people and companies that suddenly decide to get on the web and then realise that it sucks up more time than a PlayStation.

I decided to put this theory to the test. Planning initially began about nine months ago, with the congressional involvement of Del, my wife. It is not the function of this column to go into the details of this stage of testing, but those with access to the Internet may find plenty of pictorial examples of the way this sort of thing works.

Finally, the test has entered the empirical stage. This began, ironically enough, on the Y2K bug day, 9/9/99, with the birth of Audrey, a little nipper. I have since been partially responsible for looking after and providing for her and comparing the experience with that of looking after my website.

While under the stresses of giving birth, Del's guard slipped and SHE CONSENTED TO THE PURCHASE of a 36in, widescreen television

I am now prepared to share some of those findings with you to answer – once and for all – the question of how these two tasks compare.

Straight off the bat, there are a number of striking differences in favour of the website. Firstly, I have never been woken at four in the morning by a website wailing for attention. Second, I have never had to sit around and watch a website breastfeed. And thirdly, I have never yet had a website pee on me while I was changing its nappies. Indeed, apart from one occasion, I have never had to change a website's nappies at all.

Similarly, websites are often a great deal more entertaining. Some of them even do things. Audrey currently does three, often less than entertaining, things: these are sleeping, eating and nappy filling (sometimes two at the same time!). Websites tell you things, play games, alert you to other sites and send you DVDs of films that haven't even been released in this country yet.

On the other hand, no website can claim to have been responsible for delivering into this household the single most exciting thing imaginable, for which Audrey and Del alone I have to thank. Yes, while under the unimaginable stresses of giving birth, Del's guard slipped and she consented to the purchase of a Panasonic 36in flat, widescreen television.

This beauty, which, in our small sitting room, now sits some two and a half feet from the edge of the sofa, giving you that Empire Leicester Square feeling, is the centrepiece of my rationalisation for buying Region 1 DVDs over the web. I get them from www.dvdboxoffice.com, a Canadian wonder (like me) that currently doesn't charge postage (also like me).

Of course, financially, the purchase of a too-big TV and lots of DVDs will, without a doubt, have a significant impact on the household budget. My thinking is this: right now we're keeping Audrey outlay to a minimum – the kid's not paying for any food and all of her clothes so far are hand-me-downs, mostly from the progeny of my outrageously productive sister. And, anyway, by the time we've paid off the TV, Audrey should be out at work, earning her keep and fending for herself.

Now, those who may have had an opportunity to look at my website [would that be at www.paulsmith.com, by any chance? – Ed] more than once, and finding it hardly changed, will not necessarily have the greatest respect for my potential parenting skills. In fact, it is more akin to a site abandoned, although I am now setting for myself the ponderous task of updating the site between the time I finally finish writing this column and the time you get to read it.

Because in the end, there is one very strong similarity between the two: they both need an awful lot of care and attention lavished on them. If you just leave them to themselves, they don't really progress and those looking at your work in this area begin to lose respect and never come back.

They may start talking behind your back: 'You know, I've visited that bloke's website/baby twice and he hasn't updated it/her at all'. Obviously, I don't want any of that sort of talk going on about *my* website, so I really am going to have to make more of an effort. Right after I change this nappy.

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letters

Send your letters to >
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or email > letters@pcw.co.uk
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Cranking up the speed like crazy

In *PCW October 1999* Gordon Laing toasted (in more ways than one) the humble Celeron for making 1GHz of processing power available. November's cover screamed 'Fastest PC ever!' with 800MHz extracted from a single processor – although not quite as affordable. So what do we get if we merge these two ideas? How much over-clocking will a Celeron stand if you chill to -40 centigrade – and then dual it? What if we take Intel's latest 700MHz processor and give it the same treatment? I'm pretty sure this will give you next to 2GHz of processing power on a desktop in the not too distant future. How far away from a Cray on a desktop are we?

Rod M Main
Newhaven

LETTER OF THE MONTH

It's a Jungle out there...

I have been a customer of Software Warehouse for some years and welcomed the news that through jungle.com (*PCW November 1999*), I can now order products from the web, save on the post and packaging charges and receive an additional gift to the one already received for every order at Software Warehouse.

Too good to be true? You'd better believe it. I connected to the jungle.com website on 26 September to order software and hardware and again on 27 September, but I found that the information about products was inconsistent. Some products have dedicated information windows, others none. And I did not find compatibility information for the products I was looking for, which was a certain scanner and an anti-virus program.

The terms and conditions listed were only valid until 31 August 1999, and trying to click on the 'BUY' button was hazardous because the window with the info about the product and the price, etc, only stays open for a few seconds. While trying to click on the item again to read about it further, it was added to my shopping list.

Upshot? I called Software Warehouse's customer service line and was curtly told that 'they have nothing to do with Jungle'. Any request for further information was just stonewalled. In the end, I called Software Warehouse's sales line and ordered direct. The result is that I do pay delivery charges (reduced) and I do not receive the extra free gift promised when ordering online. The fact that Jungle's website made ordering online virtually impossible didn't count. Because, as I was told by the salesperson, 'every company has teething problems!'

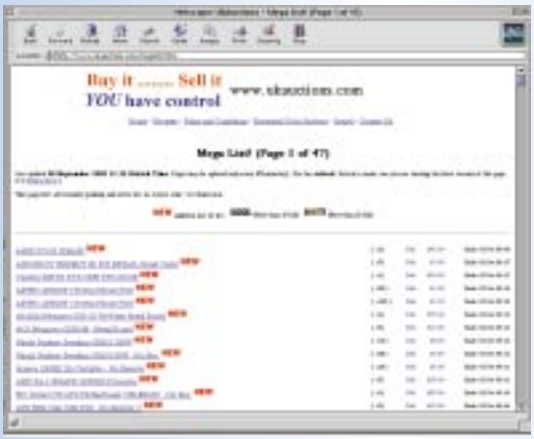
I feel that whoever throws these new services at their existing customer base, should make sure everything works before going 'Live'.

Astrid Newsham
Newbury, Berkshire

Going, going...

I read with interest your article on online auctions (October 1999). I feel you dismissed www.ukauctions.com a little unfairly. I have made many purchases from the site and they have all gone very smoothly, and I have picked up some excellent bargains. I would rather use a site with 'few' quality items than have to plough through mountains of dross to find what I am looking for. In addition, the site admin team always respond to queries quickly and they're always very friendly and helpful.

John Jones
beanies4all@hotmail.com



***THE EDITOR** replies > We didn't 'dismiss' any specific UK website. The article was meant to whet the appetites of our readers and direct them to an important new way of selling and buying second-hand goods. It wasn't meant to be a comprehensive listing of auction sites – in fact there are lots of very good sites (such as the widely known www.qxl.com) that weren't featured in the article.*

...letters

We don't sell pirated goods

With regard to your news story 'Font Pirates Walk the Plank' (*PCW November 1999*), I would like to set the record straight. My company, CD Wholesale, specialises in buying and selling end-of-line and liquidated stock. The offending product, a CD containing more than 4,000 fonts, was purchased by CD Wholesale for this purpose. We believed and still believe that this product is not a pirated copy.

To clarify this matter, Linotype Library claims that they own the word UNIVERS. The offending product was called UNIVERSE OF FONTS & ICONS. Although we disagree with their claim, it was quickly established that a few hundred pounds would appease them. We took a commercial decision to pay them to go away rather than take on expensive litigation.

I would be most grateful if you would let your readers know that we pride ourselves on only offering the best of quality software at cheap prices, and that we do not trade in pirated goods whatsoever.

Tony Anderson
CD Wholesale Ltd

***THE EDITOR** replies > It is the policy of our newsdesk never to print a story without getting both sides of the argument. In this case, we slipped up, and we are happy to clarify the situation from your perspective.*

Making a Monkey of Us

I read with interest your Retro review of the CBS ColecoVision (*PCW November 1999*) and could not help but notice Gordon Laing's explanation of why the arcade game Donkey Kong was called so.

The game title has nothing to do with a Big Ape being as stubborn as a mule or a donkey, but more to do with a mistranslation of the original Japanese printed on the arcade cabinet.

I believe that the original game was called Monkey King in Japanese, which makes much more sense, but the translator got it wrong.

Of course Donkey Kong was not the only arcade game to suffer from this. Who could forget the unforgettable racing game 'Continental Circus'...

Dean Belfield
BelfieD@intgame.com

Now don't get all catty on us!

I was appalled at the thought of putting a cat on a scanner and scanning it (*Projects & Resources PCW November 1999*). Can you imagine the damage its claws could do to the glass on your scanner, as it tried to scrabble off? Perhaps these animal lovers should have their pets de-clawed (for their own safety) before attempting to scan them.

Jim Hogg
Dumfries

***THE EDITOR** replies > We'd also like to draw readers' attention to the problems of furballs in the SCSI interface and catsick on the transparency adaptor.*

Clarification on the Dell Dimension XPS 75

In our 'Ultimate Home PCs Group Test' (PCW November 1999), we reviewed a machine called the Dell Dimension XPS 75. The name and specs were supplied to us, along with the machine proper, by Dell. They have now informed us that the machine is called the Dell Dimension XPS T500. Readers should ask for this machine if making enquiries with Dell.

A great Hull-abaloo!!!

I am a loyal subscriber and an avid Internet freak who tends to run up BT phone bills at an alarming rate. But then I read in Brian Clegg's column (*PCW November 1999*) a few sentences that made me foam at the mouth. The words 'Kingston', '£15 monthly charge' and '5.5p per call no matter the length' were like music to my ears. Naturally I went into a state of shock, then I tried in vain to search the web for a link or telephone number so I could get in contact with them to find out more about this dream offer, but alas, I found nothing. Weeks of depression set in, and for a long while I roamed the streets late at night searching for a release to my problem. Please, please help me and give me more information about this illusive company and its Internet connection plan.

Richard Lee

***BRIAN CLEGG** replies > There is good news and bad news. The good news is that you can find out all about the service by going to www.kingston-internet.net. Click on the Karoo button in the top bar, then select Karoo Xtra as the product from the RHS bar.*

The bad news is there was a bit in my column that said 'Hull [has] its own telephone company'. Which means to use Karoo Xtra you will need to have a Hull telephone number (01482) and use Kingston as your telecom provider. So unless you are lucky enough to live in the right place, like me, you are going to have to wait for BT (or someone else) to get the message!

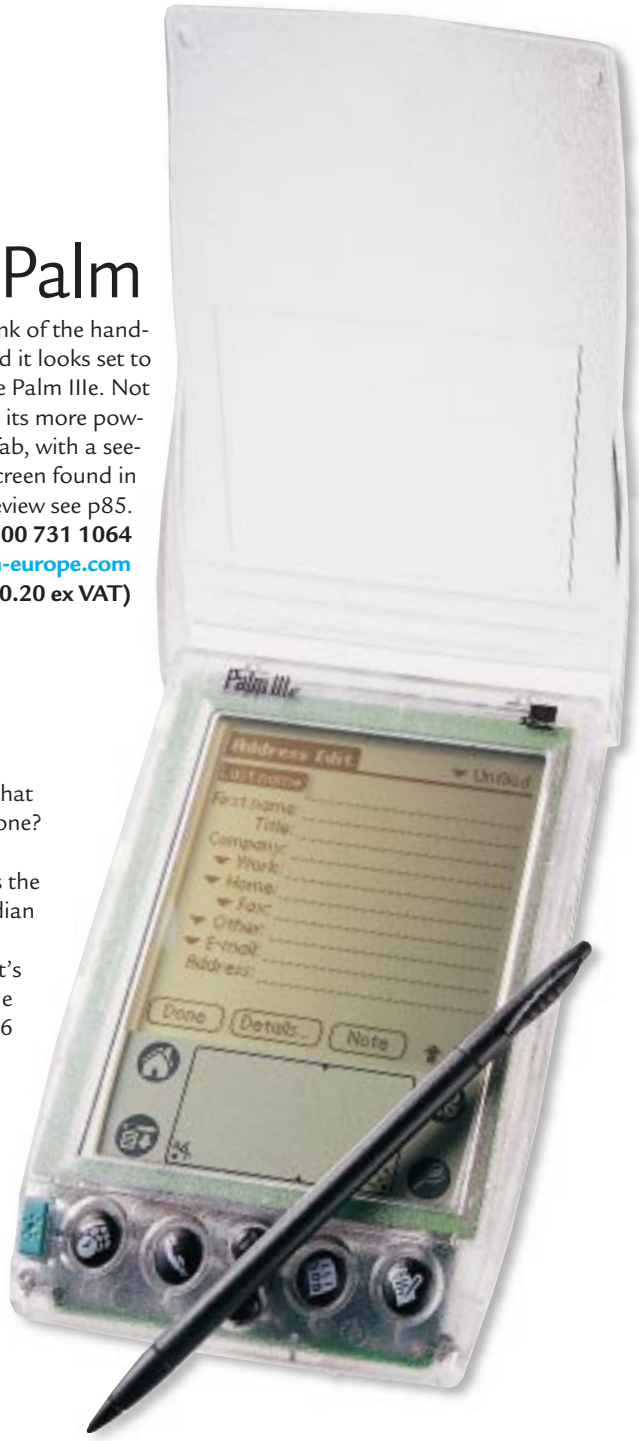
gadgets

compiled by Nik Rawlinson

Keep Palm

3Com already has a sizeable chunk of the hand-held computing market and it looks set to increase that with the launch of the Palm IIIe. Not only is it lighter on the pocket than its more powerful brethren, but it also looks fab, with a see-through skin and the same great screen found in the IIIx and V models. For a full review see p85.

Contact Palm 0800 731 1064
www.palm-europe.com
Price £199.99 (£170.20 ex VAT)



Beat the clock

Bill in Washington and Tony in London want to chat on the Internet at five tonight, but in whose time zone? Now you can eliminate these quirky annoyances of modern life with the Swatch Beat watch, which splits the day into 1,000 beats. Swatch has created a new meridian in Switzerland – Beil Mean Time (BMT) – and a day on Internet time begins at midnight BMT (0 beats). When it's noon there, it's 500 beats worldwide – no matter what the local time. So now Tony and Bill can arrange to chat at 786 beats and there will be no confusion.

Contact Swatch 01703 646800 www.swatch.ch
Price £45 (£38.30 ex VAT)

Dial-a-rodent

How do you burn an idiot's face? Phone him up when he's doing the ironing. That seems to have been the inspiration for the MousePhone which is, quite simply, just what the name implies – a mouse with a built-in phone. Or is it a phone with a built-in mouse? Worried you'll not be able to check your online diary while you're on the phone? Not a problem – use the hands-free kit.

Contact Forefront Technologies 01792 543620
www.ffront.com
Price £39.99 (£34.03 ex VAT)

Minutely mobile

The Sharp PC-A280 is one of the smallest, slimmest and most beautiful notebooks available. And with a 366MHz PII under the hood it packs an impressive punch, probably outclassing most home users' PCs. Get the full low-down on p.81.

Contact Sharp 0800 262958
www.sharp.co.uk
Price £2,344.13 (£1,995 ex VAT)

Intelligent Ericsson

Mobile phones are no longer just for talking into and the Ericsson T28 is just the latest in a long line of phones to feature data capabilities. It's fairly intelligent, too, recognising that when you use it in a car it'll need to turn up the volume of its ring, and diverting all incoming calls to an alternative number when you plug it in to charge. Its icon-based display also makes a nice change from text menus.

Contact Ericsson 0990 237237
www.ericsson.co.uk
Price £299 (£254.47 ex VAT) inc connection

Special filter

Office equipment pumps out harmful ozone, apparently, which you really don't want in your working area, even if it will filter out the sun's harmful rays coming through your window. That's why the noZone was invented. This lemon-scented iMac coloured disk sits on your desk and keeps you allergy free.

Contact Atmospheric Solutions 0870 120 1262
www.atmospherics.co.uk
Price £15.99 (£13.61 ex VAT)

Pic a winner

Sony is pushing the Memory Stick for use in its digital cameras, but the really clever thing is what you can do when it's full. Rather than printing your images, how about simply slipping your Memory Stick into one of Sony's snazzy new electronic picture frames. Each has a 5.5in TFT display to play back your JPEG images or MPEG video. It's the ultimate tree-friendly, wall-friendly frame.

Contact Sony 0990 424424
www.sony.co.uk
Price £700 (£595.74 ex VAT)

Bit parts

Fujitsu has come up with what is undoubtedly the most desirable of all PCs. This mobile wonder can be used as a pen pad or a desktop, making it ideal for mobile workers or those who need to take notes with a stylus while on the move, even from within standard Windows 98 applications. Notes can then be shared with colleagues on the network. We give it a full probe on p75.

Contact Fujitsu 0181 573 4444
www.fpsi.fujitsu.com/product/stlt.htm
Price £2,606.15 (£2,218 ex VAT)

reviews

Here we are in the last December of the millennium and I find myself wondering why it is that the end of every century seems to herald some form of peaceful revolution? From the middle to the end of the last it was the industrial revolution and now, at the end of the 20th Century we're marvelling at the technological equivalent. The growth of the Internet has undoubtedly been one of the major driving forces behind this and it is this self-same, wired world that is drawing cries from pre-millennial luddites worldwide. They say it is turning us all into insular drones happier sitting in front of a computer screen than out in the fresh air or leaning on the bar of the local pub. Perhaps for some this is true, but for the vast majority it is far wide of the mark. What these people don't realise is that this situation was not arrived at by choice. The very nature of the medium forced its 'viewers' and participants to be locked to their desks by restricting them to work, library or university access – it's only in the last three years that the Internet has made extensive in-roads as far as the home is concerned. More recently, the explosive uptake of PDAs (see the **3Com Palm IIIe** on page 85) has seen the Internet break free of the lap or desktop, and the luddites can now be happy that we can at last browse and email from the pub or park. So when people look back at the end of this century from the end of the next, which revolution will they see – the one that wired the world or the one that put it in our palm?

NIK RAWLINSON, REVIEWS EDITOR
NIK_RAWLINSON@VNU.CO.UK

VNU European Labs

VNU Labs tests all kinds of hardware and software, from PCs and modems to databases. All our tests simulate real-world use and for the most part are based on industry-standard applications such as Word, Excel, PageMaker and Paradox. Our current PC tests for both Windows 98 and NT are the SYSmark tests from BAPCo. In all our performance graphs, larger bars mean better scores.

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HEAD TO HEAD

106 Removable media vs removable hard disk

Ratings

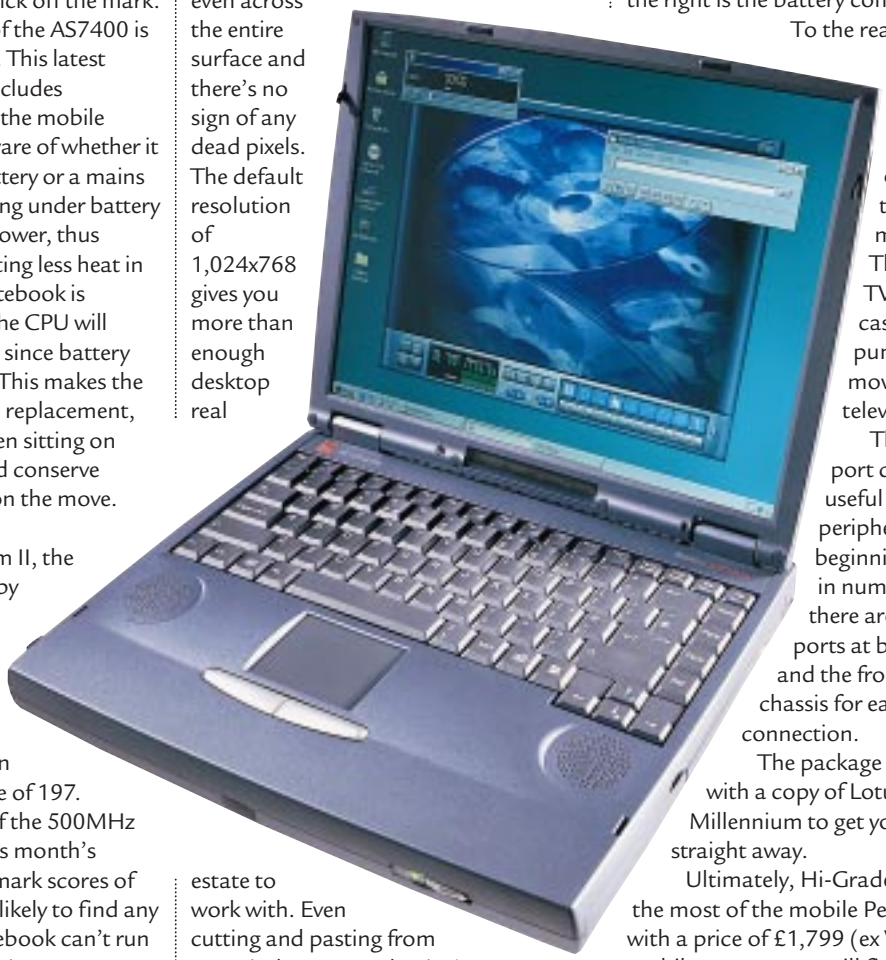
★★★★★ Buy while stocks last
★★★★ Great buy
★★★ Good buy
★★ Shop around
★ Not recommended

Hi-Grade Notino AS7400

If you get hot under the collar at the thought of a PIII-powered notebook, you won't be disappointed.

The AS7400 is the first Pentium III equipped notebook that we've seen at *PCW* and top marks go to Hi-Grade for being so quick off the mark.

Beating at the heart of the AS7400 is a mobile Pentium III 450. This latest wonder chip from Intel includes improved intelligence for the mobile computer. The CPU is aware of whether it is being powered by a battery or a mains connection. If it's operating under battery power the CPU will run slower, thus saving power and generating less heat in the process. Once the notebook is connected to the mains the CPU will ramp up to its full speed, since battery life is no longer an issue. This makes the AS7400 an ideal desktop replacement, as it can run very fast when sitting on your desk, but will try and conserve battery life when you're on the move.



Like the mobile Pentium II, the Pentium III is backed up by 256KB of Level 2 cache, running at the full speed of the processor. This makes it a very nippy chip, and Hi-Grade's baby turned in an impressive SYSmark score of 197. Considering that many of the 500MHz Pentium III systems in this month's group test turned in SYSmark scores of just over 200, you're not likely to find any application that this notebook can't run as well as a desktop machine.

It's not just the processor that's impressive, though – it also has 160MB of RAM on board. With this kind of processing power and memory capacity, there really isn't anything to which the AS7400 couldn't turn its hand. It could even have a good go at 3D modelling. And in case you were wondering where all your projects would go, fear not, there's a 10GB IBM TravelStar hard disk spinning inside the chassis, so storage space shouldn't be an issue for quite some time.

However, as with any notebook computer, ergonomics are every bit as important as performance. The screen and the keyboard are paramount, and Hi-Grade has come up trumps in both departments. The 14.1in TFT display is a fine example of its kind. The lighting is even across the entire surface and there's no sign of any dead pixels. The default resolution of 1,024x768 gives you more than enough desktop real estate to work with. Even cutting and pasting from one window to another isn't too much of a chore. The keyboard is easy to type on with a lightly sprung action that's not too tiring to the fingers. There are better notebook keyboards, IBM and Seimens tend to produce the best examples, but Hi-Grade has nothing to be ashamed of. It doesn't take long to achieve a fast typing rate and thankfully the touch pad is far enough away from the space bar to avoid accidental activation. If there's one criticism, then it's the small Return key, but it's not too much of a problem.

There isn't anything to which the AS7400 couldn't turn its hand

In true desktop replacement style, both the floppy drive and the Panasonic DVD-ROM drive can be internally mounted simultaneously.

On the left of the case you'll find a full array of audio mini-jack connectors along with two PC Card slots, while on the right is the battery compartment.

To the rear of the unit there is a full complement of ports, including a connector for the built-in modem. There's also a TV-out port, in case you want to pump a DVD movie out to your television.

The single USB port could come in useful now that peripherals are beginning to appear in numbers, and there are also infrared ports at both the rear and the front of the chassis for easy wireless connection.

The package is rounded off with a copy of Lotus SmartSuite Millennium to get you productive straight away.

Ultimately, Hi-Grade has made the most of the mobile Pentium III, and with a price of £1,799 (ex VAT) many mobile power users will find it hard to resist.

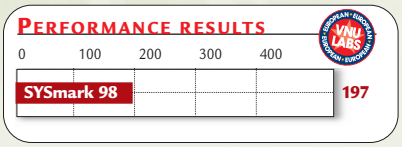
RIYAD EMERAN

PCW DETAILS

★★★★★

Price *£2,113.82 (£1,799 ex VAT)*
Contact *Hi-Grade 0181 532 6100*
www.higrade.com
Good points *Incredibly fast and very well featured*
Bad points *None*
Conclusion *A stunning notebook computer from Hi-Grade, showing off the mobile PIII to its full potential*

PERFORMANCE RESULTS



Carrera Octan M700

This high-octane offering should quench your thirst for PCs at the forefront of technology.

This is one of the first two 700MHz Athlon-based systems we have seen, and anything that follows has a lot to live up to. This is an exceptionally well-built machine with an immaculate interior. All cables are tied neatly out of the way of every major component, making changing the processor or memory easy.

The processor itself sports a huge heat sink, whilst the 128MB RAM is supplied in the form of a single module. This leaves two further slots free for future use but this initial allocation should be enough to keep you going for some time to come. There's plenty of room for expansion in other areas, too. Three PCI slots and a single shared slot remain vacant, although you would be unwise to fill the uppermost PCI slot as it would block the airflow to the graphics card heat sink.

There is only one free shared slot, but the placement of the front-panel indicator light connectors means that any ISA card protruding more than a couple of centimetres from the end of the slot might not fit. However, there are only a few expansion cards still being produced in an ISA format, the most notable examples being home networking products, so it's fairly unlikely you'll need to use it.

This is an exceptionally well-built machine with an immaculate interior

If Carrera's engineers had been looking to cut costs they could have made do with the onboard sound and the jacks in the back of the system case. Instead, though, they went out to impress, with the addition of a Vortex SuperQuad sound card.

As far as drive bays are concerned, there's a single 3.5in and three 5.25in external bays left vacant for future use. The internally-mounted hard drive, meanwhile, is a UDMA66 22GB IBM Deskstar, speeding along at 7200rpm. Backup storage is catered for with the inclusion of a Panasonic LF-D111 DVD-RAM drive, while a 5.2GB rewritable disc has been thrown in to get you started right away. Although DVD-RAM discs arrive in their own caddy and the drive must be able to accommodate them, a simple slot in the middle of the drive tray allows it to also handle regular CD-ROM discs. CD-ROM and DVD-RAM discs are treated as two distinct drives and the contents of Windows' 'My Computer' dynamically changes to represent the media inserted. At 5.2GB a go, you should have enough storage capacity on a single disc to back up a large chunk of your valuable data.

The keyboard and mouse are unremarkable but comfortable, and around the back of the case we found a parallel, two serial, two USB and a couple of PS/2 ports. The monitor, meanwhile, is an excellent LG Studioworks 910SC. In our tests we could detect no flicker at 1,600x1,200 resolution. Its extensive OSD lets you quickly change any aspect of its working, although we found ourselves stepping through a large number of options to change even basic functions. It has uniform focus across its entire surface but did demonstrate slight moiré on all test patterns. That said, we were impressed by its colour registration – all guns were firing perfectly in line at the default setting, and it had rock steady regulation, so that even when a flashing block was applied to an otherwise black screen there was no change in the size of the image. The monitor was driven by a GeForce 256 card, incorporating nVidia's GPU (see Evesham review, p94 for details).

In all, this is a very impressive system and the inclusion of a DVD-RAM drive is the sort of bold statement we would expect from a manufacturer with Carrera's reputation. This is a well thought out machine built to last for years to come.

NIK RAWLINSON

PCW DETAILS

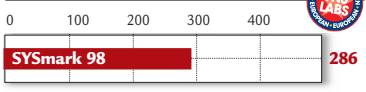
RECOMMENDED Computer World

★★★★★

Price *£2,348.83 (£1,999 ex VAT)*
Contact *Carrera 0181 307 2800*
www.carrera.co.uk
Good points *Lightning-fast, good graphics card and removable storage, astounding value for money*
Bad points *None to speak of*
Conclusion *Carrera would be hard-pushed to have made it any better and it couldn't be any cheaper. A first-class implementation of cutting-edge technology*

PERFORMANCE RESULTS

VNU LABS



Fujitsu Stylistic LT

They say the whole is greater than the sum of its parts – but these parts will take some beating.

Is it a PC or is it a PDA? You'd be hard pushed to say if you've not used the Stylistic LT, for while it may be about the same size as a Psion Series 7 it's actually running a full install of Windows 98 Second Edition. What's even more impressive is that it weighs just 2.3lb and is just over an inch thick.

Its core is a 233MHz Pentium MMX with 64MB RAM. These days that might sound a bit low end, but Windows runs on it surprisingly well, and with a screen mounted suspend button that will dump the contents of the memory to the hard drive before powering down, you can come back and reboot later in as little as 20 seconds.

▶ DIVIDE INTO THREE AND RULE OVER THE PORTABLE PC MARKET

The panel is an 800x600 8.4in TFT display and although it suffers a little from variable light intensity and slight reflection it is very sharp and comfortable to look at for extended periods. It also has a very wide viewing angle. It's driven by a NeoMagic MagicGraph 128XD graphics chip. This is fairly old technology now, first appearing in 1997, but it has low power consumption for battery-based use, which is ideal if you're using the Stylistic LT away from its dock. It also allows for an external monitor to be attached and driven at 1,024x768.

The panel can be detached from the base unit, which can also be used to power it and charge its battery, and it then acts like a powerful PDA. Its handwriting recognition skills aren't up to those of the Philips Nino but then it must be remembered that Windows 98 was never designed for this purpose.

The Stylistic LT is actually running a full install of Windows 98

If you'd rather stick to keyboard input there's a numeric hard keypad to the right of the display and when it comes across a text input field Windows will append a small button. Clicking it brings up a soft keyboard like that found in the vertical revision of Windows CE. When the Stylistic LT is docked you can take advantage of its small wireless keyboard.

Although a fraction of the size of a regular PC keyboard it should pose no problems for those used to working on a Psion or LG Phenom.

This runs on a couple of AAA batteries. A fully charged Stylistic LT lasts around an hour and a half on battery power, but an optional pack can increase this to three hours, and there is no need to turn it off when docking or undocking.

When docked, the Stylistic LT can take advantage of the base station's adjustable tilt to perfect the viewing angle. The docking port also contains a range of ports for serial and parallel connection, external monitor, keyboard and mouse, power, 100BaseTX LAN, and an external floppy. The panel itself, meanwhile, supports a single USB port, as well as headphone and mic sockets to back up the internal speaker, a power socket, 4Mbit/sec IrDA and two Type II PC Card slots. You'd have to use one of these slots to connect an external CD-ROM drive (not supplied) if you don't want to end up installing software over the LAN. Storage is handled by the 4.3GB UDMA hard drive.

A nice touch is the optional portfolio case, from which the Stylistic LT needn't be removed before use, making this the ideal portable 'desktop' PC. Its uses are immediately apparent, and Fujitsu is positioning it for use within environments in which 'decision support' is a key requirement. Doctors, for example, would be able to make ward rounds using the Stylistic LT and dock back at their desks, synchronising with the network. It's also highly desirable but unfortunately, Fujitsu is aiming it solely at the corporate market and it won't be available for home consumers.

NIK RAWLINSON

PCW DETAILS

★★★★★

Price *Stylistic LT including LAN £2,606.15 (£2,218 ex VAT), mini docking station £176.25 (£150 ex VAT), Slip case £78.73 (£67 ex VAT), external floppy £98.70 (£84 ex VAT)*

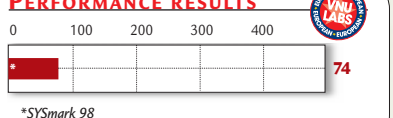
Contact *Fujitsu 0181 573 4444*
www.fpsi.fujitsu.com/product/stlt.htm

Good points *Small, cute, portable*

Bad points *Not destined for the consumer market, expensive*

Conclusion *The most desirable desktop portable around*

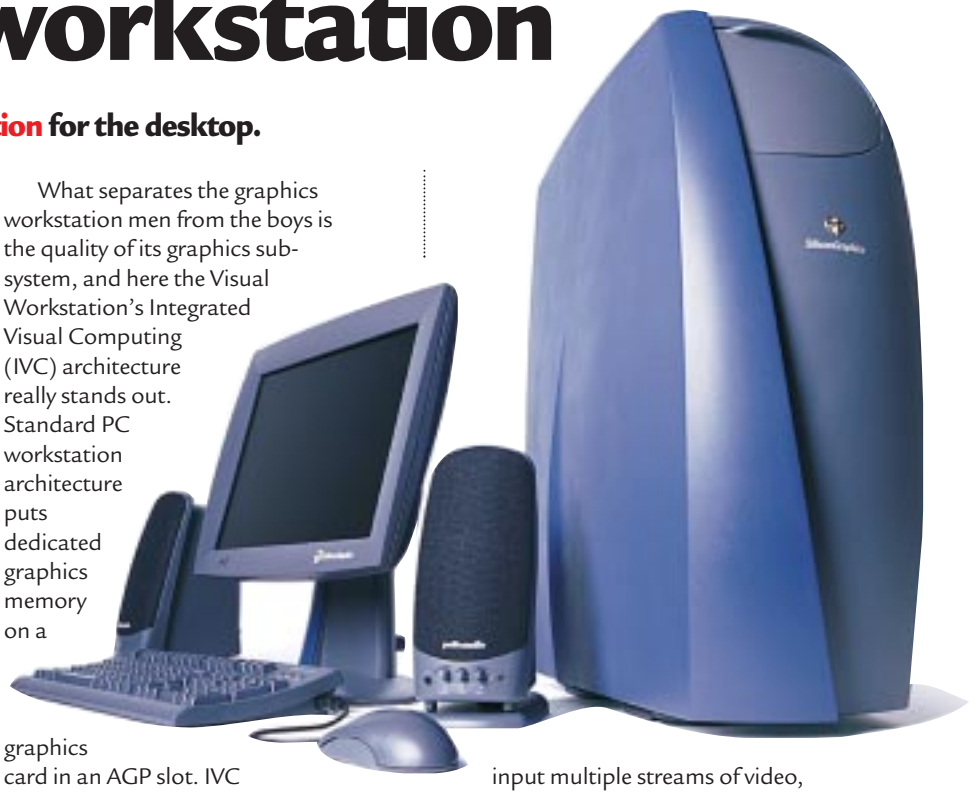
PERFORMANCE RESULTS



*SYSmark 98

SGI 540 workstation

An affordable graphics workstation for the desktop.



Not so long ago, if you wanted a hi-res 3D graphics workstation, you bought a proprietary RISC-based UNIX box from companies such as HP, Sun or Silicon Graphics (now SGI) and then braced yourself when it came to asking the price. Times have changed, and thanks to factors such as multi-processing Windows NT, advanced OpenGL graphics subsystems for PCs, and powerful Pentium II, III and Xeon processors, workstations have become very affordable – well, almost. As a result, last year sales of x86-based workstations accounted for over half of all workstations shipped.

SGI broke with tradition earlier this year when it announced its first x86-based/Windows NT 4.0 workstations – the 320 and 540 Visual Workstation. According to SGI, the 540 is the only desktop PC that supports four-way SMP – it can be configured with up to four 550MHz Intel Pentium III Xeon processors and 2GB of SDRAM memory. And the entry ticket for all this costs less than £5000, which is peanuts in graphics workstation terms. It's designed to run high-end, 3D graphics-intensive applications, such as MCAD (mechanical computer-aided design), animation, 3D modelling, data visualisation and other digital content creation applications, which used to be the exclusive domain of UNIX-based systems.

The Visual Workstation is actually more server-sized, and rises more than 26in off the desktop. It's enclosed in the standard SGI space age case, with a curved grey exterior and a warped indigo side panel. When you turn the machine around and depress a button at the rear, the side panel pops off to expose a spacious interior and three open drive bays. SGI also provides six open bus slots, but these are 64bit PCI slots and can't be used with most mainstream peripherals – the installed QLogic QLA1080 LVD Ultra2-Windows SCSI host adaptor being the exception to the rule. Likewise, the system uses unique memory modules available only from SGI and a few other sources. The workstation is normally paired with the stunning 1600SW flat-panel digital display, though this is an optional extra, adding another £1,790 to the bill.

What separates the graphics workstation men from the boys is the quality of its graphics sub-system, and here the Visual Workstation's Integrated Visual Computing (IVC) architecture really stands out. Standard PC workstation architecture puts dedicated graphics memory on a graphics card in an AGP slot. IVC is designed to take features that typically require add-in cards and integrate them into the core logic of the Cobalt Graphics chipset. The integrated features are linked by a high-speed, low-latency 3.2GB/sec graphics-to-memory interconnect and a 1.6GB/sec I/O interconnect. The bottom line is, extremely wide video bandwidth, more than six times standard AGP 2X and more than 12 times the traditional PCI bus. This is sufficient bandwidth to simultaneously support multiple streams of uncompressed NTSC or PAL video, giving graphics professionals the freedom of working in realtime with uncompressed data.

The review machine came with 1GB of SDRAM, 112Mb of which was allocated to the video sub-system. This proprietary Unified Memory Architecture, based on the Cobalt chip set, allocates CPU memory, frame buffer, Z-buffer and texture memory dynamically from the main system memory pool. This shared memory architecture makes it possible to include video as a graphics component, map video as a texture or capture and play back multiple streams of video. Audio and video I/O ports are both directly connected to the chip set – as are graphics, networking and FireWire (IEEE1394) I/O. In practice, this means that the Visual Workstation will let you input multiple streams of video, edit them with software-based video and hardware-based 3D effects, and output them – all in realtime.

Sadly, SGI's groundbreaking flirtation with x86 and Windows NT 4.0 hasn't lasted long – as recently as September, the company announced a complete platform strategy U-turn. It has decided to jettison Windows NT 4.0 and concentrate on Irix and Linux development, while it looks for an as yet unnamed partner to share and eventually offload the Visual Workstation range onto. It seems that creative NT users just aren't turned on by sexy kit.

ROGER GANN

PCW DETAILS

★★★★★

Price *£5,076 (£4,320 ex VAT) (Dual Pentium III Xeon CPU 500MHz 1MB cache), 1600SW flat-panel monitor – £2,103.25 (£1,790 ex VAT)*

Contact *SGI 0118 925 7500*
www.sgi.com

Good points *Outstanding graphics sub-system, the specification a wish-list come true*

Bad points *Proprietary features eg. proprietary DIMMs*

Conclusion *Arguably the best PC platform for realtime video-editing, the Visual Workstation offers tremendous bang-per-buck. Curiously, its ordinary graphics performance isn't exceptional, but users won't be buying it for this.*

Sharp PC-A280

Sharp by name and sharp by nature – the ultra-portable with the dream screen.

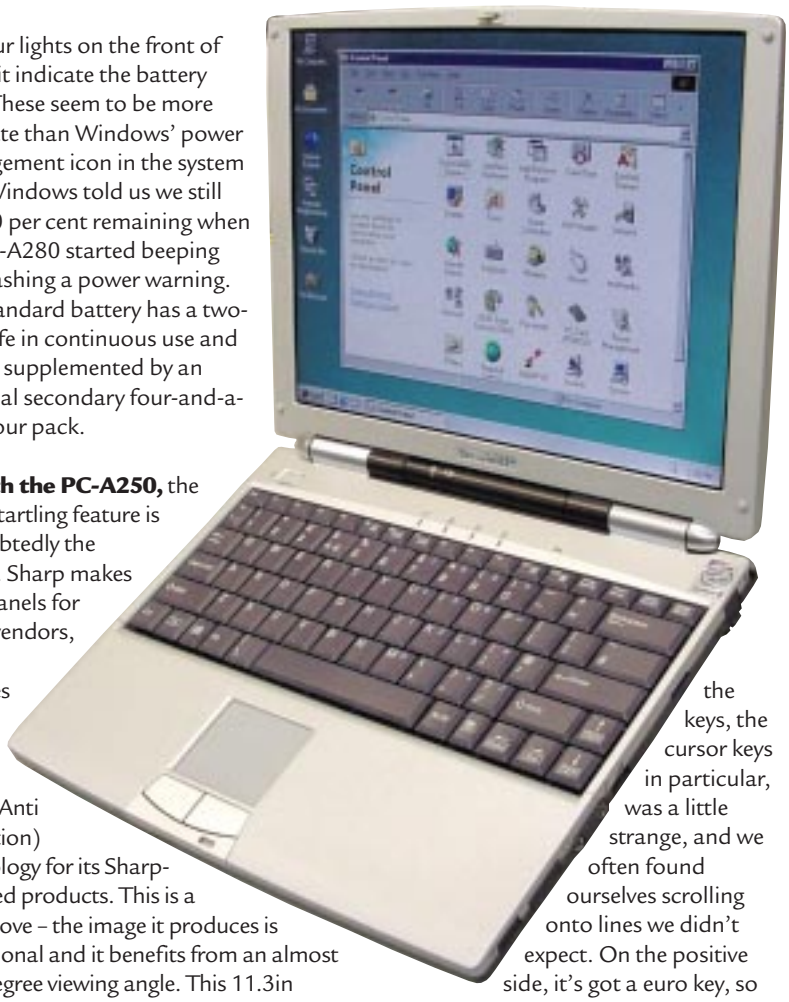
There are times when it's just no fun being a reviews editor, and those times are the end of a month when you have to give back a really desirable bit of kit. This month, that turned out to be Sharp's new ultra-portable – the PC-A280. It boasts features that, just a few months ago, a desktop machine would have been proud to sport, and all are packed into a 1.4kg package just 263x212x31mm in size at the bulkiest point.

The brain is a 366MHz PII, while the hard drive tops off at 8.1GB with options for 64MB or 128MB memory. If you opt for the lighter of those two configurations, you can send it back for an upgrade to 128MB, and Sharp will return it to you 48 hours later. In exceptional circumstances they should be able to reduce this to a day's turnaround.

With such a small form factor it's no surprise that there are no internal removable media drives. The back of the bundled external floppy has a port replicator for parallel, serial and PS/2 devices, but we were disappointed that the CD-ROM is an optional extra. With almost all current software coming on CD or DVD-ROM this could make installing new applications difficult, but Sharp explained that installation over a LAN was in mind during the design phase, so it's just as well there's a port for 10Base-T/100Base-TX connections around the back.

For a machine so small, this port is joined by a surprising range of other connections. Along the edges we find a Type II PC Card slot with CardBus support, two downstream USB ports (one on each side), headphone and mic jacks, a hardware volume control, the proprietary connector for the hot-pluggable external floppy drive and power connectors and an infra-red port that is both ASK 4Mbit/sec and IrDA 115Kbit/sec compliant. There's also an integrated 56K modem. Along the back, meanwhile, you'll find ports for a VGA monitor, network and secondary power supply.

Four lights on the front of the unit indicate the battery level. These seem to be more accurate than Windows' power management icon in the system tray: Windows told us we still had 50 per cent remaining when the PC-A280 started beeping and flashing a power warning. The standard battery has a two-hour life in continuous use and can be supplemented by an optional secondary four-and-a-half-hour pack.



As with the PC-A250, the most startling feature is undoubtedly the screen. Sharp makes LCD panels for other vendors, but it reserves its AGAR (Anti Glare, Anti Reflection) technology for its Sharp-branded products. This is a wise move – the image it produces is exceptional and it benefits from an almost 180-degree viewing angle. This 11.3in panel has a native 800x600 resolution in 16 million colours, and eight keyboard controlled levels of brightness. It can fold back flat so that it runs level with the keyboard for use in almost any lighting condition you could imagine. Our unit unfortunately had a couple of burnt out pixels in the bottom right hand corner.

The image is exceptional and it benefits from a 180-degree viewing angle

There's little in the way of bundled software, Windows 98 Second Edition and LapLink Pro aside, but that is not unusual for a notebook. Our only real complaint was the keyboard. If you're opting for a laptop this small you've got to accept that the keyboard will be shrunk and although the designers have managed to maintain a 17mm key pitch with 2.5mm travel we nonetheless found it difficult to use. The placing of some of the keys, the cursor keys in particular, was a little strange, and we often found ourselves scrolling onto lines we didn't expect. On the positive side, it's got a euro key, so it's ready for the European market or when the UK eventually takes the plunge. The touch pad, meanwhile, is excellent – smooth in use and responding well to click-taps.

NIK RAWLINSON

PCW DETAILS

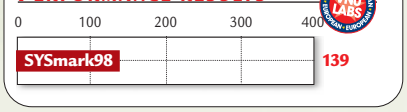
RECOMMENDED PERSONAL COMPUTER WORLD

★★★★★

Price *£2,344.13 (£1,995 ex VAT)*
Contact *Sharp 0800 262 958*
www.sharp.co.uk
Good points *Excellent screen, small form factor*
Bad points *Keyboard*
Conclusion *A sub-notebook that can hold its head up with the best of them*

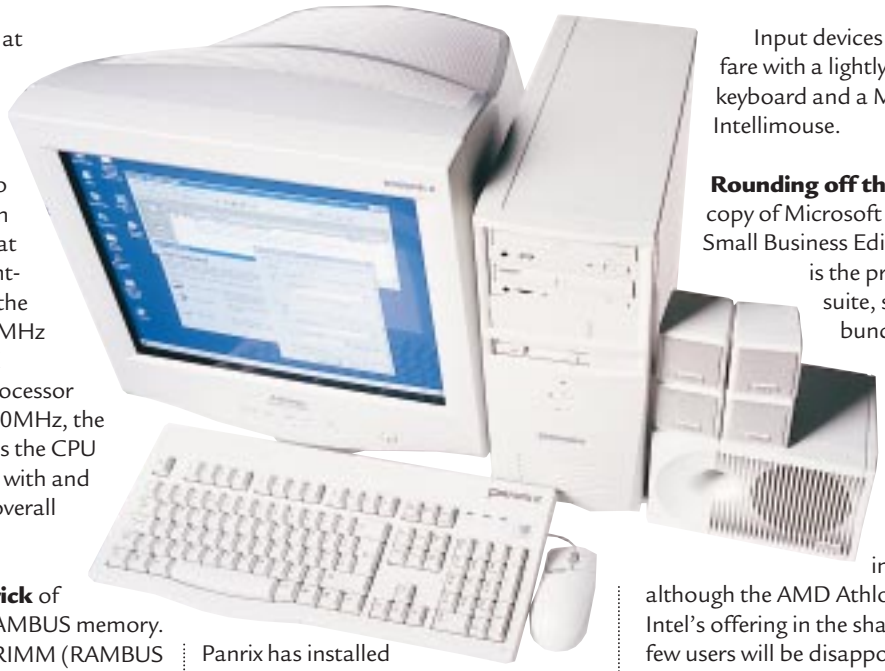
PERFORMANCE RESULTS

VNU LABS



Panrix Fusion 600 Pro

A PC for people with wads of cash who want to have the best technology Intel has to offer.



Yet again Panrix is at the cutting edge of PC technology, this time with Intel's latest releases. The SuperMicro motherboard is based on the latest 820 chipset that supports a 133MHz front-side bus, as opposed to the current standard of 100MHz supported by the 440BX chipset. Although the processor is still only running at 600MHz, the increased bus speed gives the CPU more bandwidth to play with and consequently increases overall system performance.

Completing the hat trick of new technology is the RAMBUS memory. There's a single 128MB RIMM (RAMBUS Inline Memory Module) in one of the three memory slots, but with this new type of memory, the empty slots have to be filled with blanking cards. Unfortunately RIMMs are expensive at the moment, but expect prices to drop once economies of scale start to kick in.

With core components of such a high calibre, it's not surprising that the supporting components are also first rate.

Filling the AGP slot is a Matrox Millennium G400 Max. This is a stunning graphics card with superb performance in both 2D and 3D environments (see review p189). There's 32MB of on-board memory and the dual-head support lets you run two displays simultaneously. Thankfully Panrix has coupled the G400 Max with a monitor that's more than capable of showing it off. The Mitsubishi Diamond Pro 900U is a great 19in display. With a Natural Flat tube, the picture is superb with almost no screen reflection. With a high-quality display set like this you'll be able to run almost any resolution you like.

A high-quality display set like this will be able to run almost any resolution

Sound has been taken care of almost too well. Even though there is a sound chipset hardwired to the motherboard, Panrix has installed a SoundBlaster Live! Value card. That said, the SoundBlaster card provides two stereo outputs for use with the Creative 4-Point surround speaker package that's also bundled. The overall aural effect is pleasing but there are better speaker packages available.

The final expansion card is a Diamond SupraExpress 56K modem. With a wealth of free Internet providers to choose from these days, a modem is an integral part of any PC.

Both the 5.25in drive bays are occupied. The top bay houses a DVD-ROM drive that's more than capable of playing movies as well as installing software. Below the DVD-ROM is a Sony CD-RW drive, another commendable inclusion that offers high capacity data transport as well as the ability to archive important information.

The hard disk is ingeniously mounted on the motherboard backing plate, leaving two 3.5in bays empty for future upgrades. However, with 32GB of storage space, it will be a long time before you'll need to think about upgrading. If you're more concerned with speed, you won't be disappointed either, this IBM hard drive spins at 7,200rpm and its GMR heads ensure a high data density.

Input devices are standard fare with a lightly sprung keyboard and a Microsoft Intellimouse.

Rounding off the package is a copy of Microsoft Office 2000 Small Business Edition. MS Office is the premier office suite, so having it bundled with a new PC adds a significant amount of value.

As you'd expect, performance is impressive, although the AMD Athlon still leaves Intel's offering in the shade. That said, few users will be disappointed with a SYSmark score of 234 and a 3DMark result of 5,463.

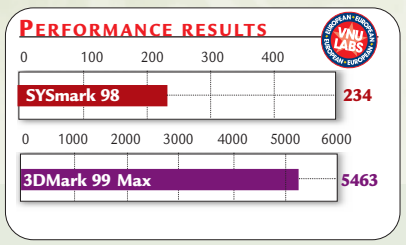
Of course, all these cutting edge components don't come cheap, the RAMBUS memory alone adds £300 to the cost of the system. However, if you want to be the first to own the latest technology you'll have to pay for the privilege. So, if you want the latest Intel-based PC and have a chunk of cash burning a hole in your bank account, check out the Panrix Fusion 600 Pro.

RIYAD EMERAN

PCW DETAILS

★★★★

Price *£2,701.32 (£2,299 ex VAT)*
Contact *Panrix 0113 244 4958*
www.panrix.com
Good points *Latest technology with great support components*
Bad points *Expensive*
Conclusion *Cutting-edge components and excellent build quality add up to a great machine from Panrix*



Sony Cybershot DSC-F505

An impressive digital camera that breaks new ground in all areas – it's zoomin' marvellous!

It seems amazing that Sony has squeezed so many features into such a small package. The main elements of this new camera fit into a body just 110x40x55mm, and the lens on the front housing holds no less than seven individual lenses with a focal length corresponding from 38mm to 190mm in a conventional film-based camera. This can swivel through 140 degrees and facilitates a 5x optical zoom which, when combined with the 2x digital zoom offers a stunning 10x zoom – far more than is found on any other digital camera.

The 2.1 megapixel 0.5in CCD has been custom designed for digital photography, and in our tests it produced razor-sharp results. 2.1 megapixel equates to a 1,600x1,200 resolution and in 24bit colour you should have no problems outputting snaps as regular photo-sized prints.

While using the full 10x zoom produced slightly fuzzy pictures as a result of the digital manipulation, those at 5x and less were crisp and well-defined. The digital zoom can be deactivated so that you don't find yourself straying into its territory unexpectedly, leaving only the 5x optical function enabled.

In macro mode the auto-focus function will quite happily cope with images as close as 8cm, and in regular use this is supplemented by a manual focus ring. If simply defocusing your images is not arty enough it also has options for solarised, monochrome, sepia and negative images.

This is an important camera in terms of digital photography technology

Images are written to Sony's new proprietary Memory Stick. This slim, purple medium – just 5cm long by 2cm wide – boasts impressive data transfer rates, writing a 1,600x1,200 resolution image in two seconds. The supplied 4MB Stick has room for 15 standard or eight fine shots at this resolution, increasing to 63 standard and 38 fine at 640x480. The optional 64MB Stick raises this to 260 standard/140 fine and 1050 standard/630 fine at 1,600x1,200 and 640x480 respectively. Sony is set to introduce a 256MB Stick next year, making these already impressive figures seem poor by comparison. Images can be retrieved in a number of ways. The easiest is undoubtedly the optional PC card or floppy disk adaptors, but its cheaper to use the bundled USB adaptor.

The 2in TFT is the only viewing option – in common with the original Cybershot. There is no optical viewfinder. Considering the excellent lens array we feel this omission can be excused on this occasion and the supplied InfoLithium battery manages to boast an impressive 50min or 1,000 shots between charges, even with the backlight turned on. A clever flap in the battery compartment door lets you run it off the mains for single-location photo shoots. The InfoLithium battery brings with it a number of benefits, including visual feedback on remaining battery life, and the LCD's graphical image of the Memory Stick gives an at-a-glance impression of the remaining storage space.

Perhaps most impressive is the F505's ability to record MPEG-1 movies, complete with audio. Up to 42 minutes can be stored on the optional 64MB Stick at 160x120 resolution. If you use the 4MB configuration this drops to 2min 40sec, but if you intend to email or post your results on the Internet, you'd be unwise to use much more than this.

This is undoubtedly an important camera in terms of digital photography technology and it incorporates a wide range of innovative functions in a relatively compact form factor. For the professional film photographer who has yet to be sufficiently impressed by the new digital world, this may be just what the market has lacked, yet it is simple to understand and easy enough for the more ambitious beginner to get to grips with in no time at all.

NIK RAWLINSON

PCW DETAILS

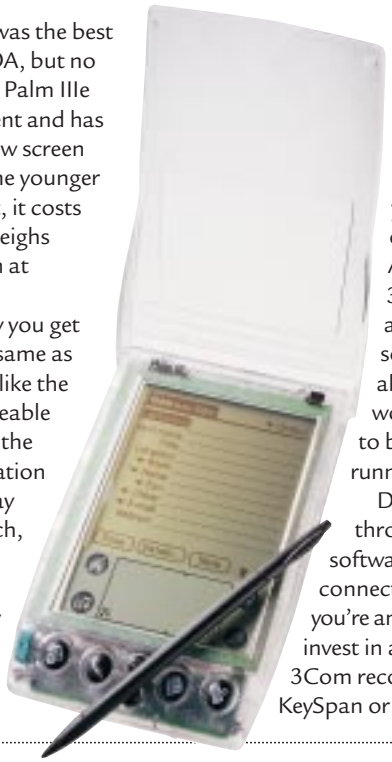
RECOMMENDED Personal COMPUTER WORLD

★★★★★

Price *£822.50 (£700 ex VAT)*
Contact *Sony 0990 424 424*
www.sony.co.uk
Good points *10x zoom, MPEG-1 recording, crisp images, good price*
Bad points *Lack of optical viewfinder may deter some potential users*
Conclusion *A first-rate camera that will appeal to the professional photographer*

3Com Palm IIIe

3Com has re-invented the Palm III and the future looks clear for the hand-held market!



The PalmV was the best looking PDA, but no more – the Palm IIIe has gone transparent and has taken that great new screen with it. Aimed at the younger 'consumer' market, it costs just under £200, weighs 168g and checks in at 11.9x8.1x1.8cm.

For your money you get 2MB of RAM, the same as the PalmV, but, unlike the V, it is user-upgradeable to 4MB, matching the standard configuration of the IIIx. 2MB may not sound like much, but it's more than enough for the average user, easily squeezing in 6,000 addresses, 3,000 appointments (about five years' worth), 1,500 to-do items, 1,500 memos and 200 emails, although this obviously depends on how much your email contacts waffle on. It runs off a couple of AAA batteries, which 3Com claims will last the average user two months, so they can be replenished almost anywhere in the world, unlike the V that has to be docked every time it's running low on juice.

Desktop connectivity is through the standard Palm software and physical connection is via the serial port. If you're an iMac user you'll need to invest in a USB adaptor, which 3Com recommends you buy from KeySpan or Entrega.

It's a shame 3Com didn't see fit to make the docking cradle transparent, too. As it's aimed just as much at the Mac market as PC users, we were disappointed to find the same black design as that bundled with the regular PalmIIIx hiding at the bottom of the box. Sold exclusively through Dixons, this has quickly become our PDA of choice.

NIK RAWLINSON

PCW DETAILS

EDITOR'S CHOICE PERSONAL COMPUTER WORLD

★★★★★

Price *£199.99 (£170.20 ex VAT)*
Contact *Palm 0800 731 1064*
www.palm-europe.com
Good points *Good-looking, fast, great screen*
Bad points *Less memory than the IIIx, but then it costs a lot less, and 2MB is more than enough for most users*
Conclusion *3Com is undoubtedly onto a winner here*

Oregon Scientific Osaris

An affordable, useable PDA for low-end users.

There are two questions you need to ask yourself before buying a PDA, or indeed any computer equipment: is it good value for money and does it fulfil your needs? The first question we can help answer, but the second is down to you, the consumer.

The Osaris is not Oregon Scientific's first outing into the PDA arena, but it is its first implementation using Symbian's Epoc operating system (as seen in the Psion Series 5). The machine is small enough to fit in your pocket, features a decent keyboard (not sparking any memories of Sinclair's ZX Spectrum) and sports a 'quarter' VGA screen at 320x200 pixels. Unfortunately the wealth of Epoc software available is unlikely to run unmodified on the smaller screen, although the major software houses are steadily addressing this issue.

The Osaris runs Epoc release 4 (not release 5 as seen in the Series 5mx), which means it addresses the former shortcomings of previous releases (eg user-definable wallpaper, templates in word, sort in sheet) but does not include the newer web browser or a Java virtual machine. To see how fast the machine was, we ran a small program that tested the time taken to sort a set of numbers and draw to the screen. The Osaris took 730 seconds to run the test. In comparison the Series 5 took 900 seconds with the 5mx storming home after only 367 seconds.

For only £200 Oregon Scientific has put together a machine that represents terrific value for money. If you are looking for a cheap Series 5, then you'll be a bit disappointed. If, however, you are in the market for an affordable, easy to use PDA with a good keyboard and excellent operating system then the Osaris is certainly worth a look.

WILL HEAD

PCW DETAILS

★★★★

Price *£199 (£169.36 ex VAT)*
Contact *Oregon Scientific 01628 680424*
www.oregonscientific.com
Good points *Epoc operating system, affordable, good keyboard*
Bad points *Small screen*
Conclusion *A cheerful, affordable PDA. It's no Series 5, but the price reflects this*

Atlas Meridian A700

Invest in your future, because here's a machine that will take some catching up.

The release of AMD's Athlon shook up the processor market. It has a new design and outperformed Intel at equivalent clock rates. AMD's relentless drive to increase its high-end market share continues with the release of its latest Athlon, clocked at 700MHz. This seventh generation processor has performed consistently well in our lab tests, and the 700MHz version certainly shifts. The SYSmark score is one of the highest we have seen, confirming the Athlon's status as a market leader.

The MSI slot A motherboard has more than enough slots for the average user. Even with everything taken into consideration, two PCI and an ISA slot remain free, and there is little that you could add to this wonder machine.

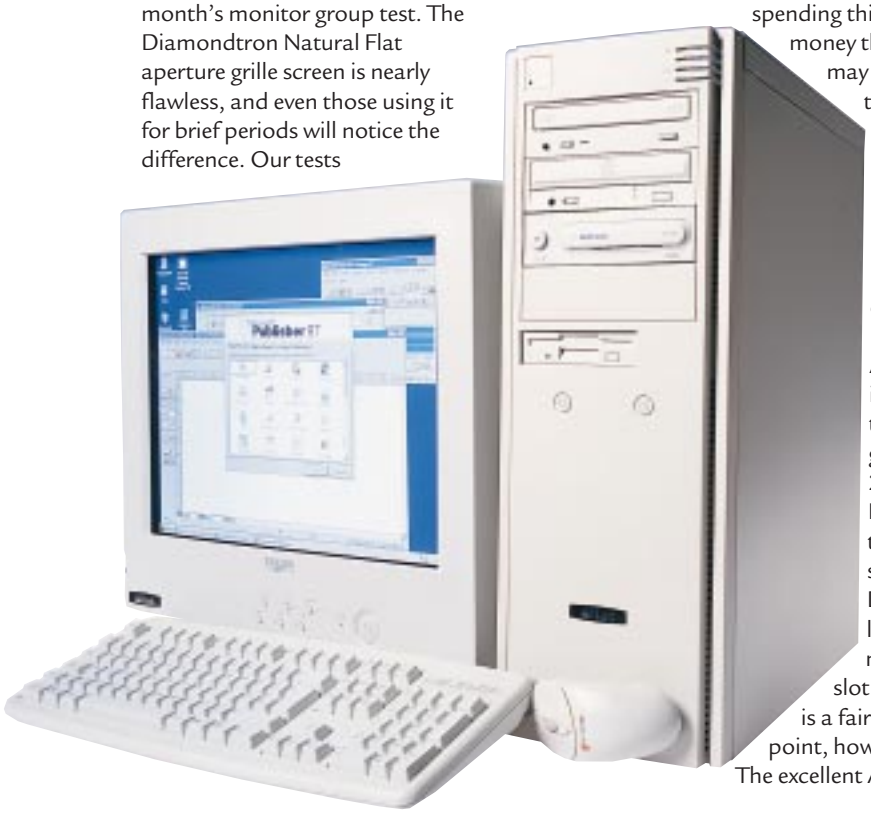
The full-size tower case is an excellent choice. Despite being so well stacked, there are still free drive bays – two free 3.5in bays above the system fan, one external 5.25in bay and one internal 5.25in bay.

The component that screams quality the loudest is the 19in Taxan Ergovision 980 TCO99 monitor, the winner of last month's monitor group test. The Diamondtron Natural Flat aperture grille screen is nearly flawless, and even those using it for brief periods will notice the difference. Our tests showed its only sticking point to be minor problems with moiré. The OSD is excellent, providing easy access to the extensive array of controls, and the rest of the machine is similarly impressive.

A third-generation Hitachi GD-2500 DVD drive occupies one 5.25in bay. Combined with the 32MB Matrox G400 Max dual-head graphics card, it will enable you to watch DVDs with no dropped frames. This excellent G400, combined with the 3D Now! instructions that are an integral part of the Athlon, really helped this machine to fly on our standard 3D Mark 99 Max graphics benchmark. It managed to beat an Intel Pentium III 600Mhz based on the 820 chipset with the same graphics card by a clear 400 points.

Adaptec has provided the SCSI controller, and the years of experience it has built up constructing such cards makes it a highly reliable choice. An 18GB IBM SCSI drive, meanwhile, is located in a drive bay above the system fan at the rear, keeping the SCSI cable well out of the way of the motherboard.

We were pleased to see that Atlas opted for a SCSI drive. If you are spending this much money then you may as well go the full distance and opt for the fastest hard drive. Our only complaint is that Atlas has installed the generous 256MB RAM as two separate DIMMs, leaving one memory slot free. This is a fairly minor point, however. The excellent Aureal Vortex 2 soundcard sits in a PCI slot. In addition to all the usual ports, it has an optical out port, useful for your minidisc player if you have one. Gamers will appreciate the A3D support this card provides.



No system is complete without a modem and this one has a standard LT V.90 Winmodem sitting in a PCI slot. For back-up, you can turn to the ADR OnStream tape drive with a whopping 30GB capacity. This can easily cope with backing up the hard drive and is an excellent addition.

Atlas is determined to make this one of the safest machines around, and has added another backup device, an AOpen CD-RW. Using a CD-R disc, this lets you create archives of your files that cannot be changed – meeting many legal requirements. Lotus SmartSuite comes pre-installed. This is a worthy office suite that will enable you to perform most office tasks.

If you have cash to burn and are looking at purchasing the best machine money can buy, then this is an excellent choice. It has everything that you need – the latest processor, sound and graphics cards together with some excellent backup devices and a gorgeous monitor. This system is as future proof as you are going to get and is well worth the asking price.

JASON JENKINS

PCW DETAILS

RECOMMENDED Personal COMPUTER WORLD

★★★★★

Price *£3,006.83 (£2,559 ex VAT)*

Contact *Atlas 07000 285 275*
www.atlasplc.com

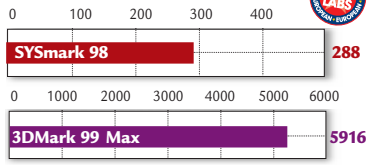
Good points *Processor, monitor, graphics card, soundcard, back-up devices*

Bad points *Very expensive, but you get what you pay for*

Conclusion *A very impressive all-rounder.*

PERFORMANCE RESULTS

VNU LABS

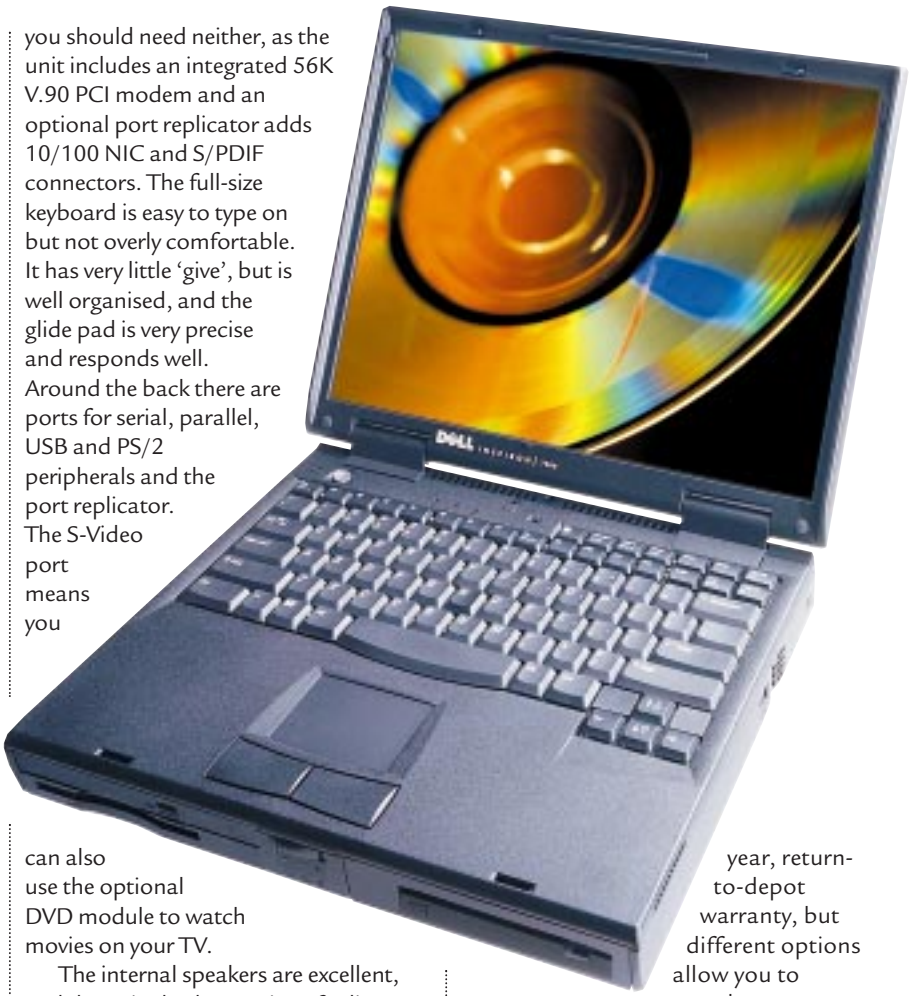


Dell Inspiron 7500

Inspired? You will be with this heavy-specced notebook.

Dell has a reputation for releasing impressive notebooks and it has strengthened its product line further with the addition of the Inspiron 7500. If you want to jump straight to the most striking aspect first, we'll start with the screen.

This 15in SXGA Hi-Res TFT display overhangs the machine's main body in line with those found on many of Dell's recent offerings and it offers a razor-sharp 1,400x1,050 resolution image that can only be described as astounding. It also has 15 per cent more pixels than on a standard 1,024x768 15in display. It's driven by an ATi Rage Mobility-P AGP chip with either 4MB or 8MB memory onboard.



It's not a particularly beautiful machine and would definitely look more at home in the factory than the executive boardroom. Looking closer, though, you'll soon start to spot those trademark Dell additions that make it the notebook of choice for the mobile power user. At its core beats a 466MHz Celeron, propped up by 128MB RAM, which no doubt helped it attain a very respectable SYSmark 98 score of 175. In the unlikely event that you turn your nose up at this, you could always go for the 450MHz and 500MHz Pentium III options instead.

In terms of storage, the Inspiron 7500 features the most capacious mobile hard drive on the market, topping off at 25GB in ATA-33 format. What's really clever, though, is the unique MegaBay, allowing you to install two further hard drives to increase the maximum capacity to 75GB. This can also take an Iomega Zip drive and, to rival conventional desktop configurations, it can handle four spindle (desktop) drives when running on external power.

An alternative would be to fill it with a second battery and increase the 7500's between-charge working life. Looking to the future, the Inspiron 7500 has another trick up its sleeve: the largest single SODIMM in a mobile machine. Its exclusive 256MB module makes notebooks with 512MB memory a reality.

Along the left-hand side you'll find a couple of Type II PC card slots. As far as external communication is concerned you should need neither, as the unit includes an integrated 56K V.90 PCI modem and an optional port replicator adds 10/100 NIC and S/PDIF connectors. The full-size keyboard is easy to type on but not overly comfortable. It has very little 'give', but is well organised, and the glide pad is very precise and responds well. Around the back there are ports for serial, parallel, USB and PS/2 peripherals and the port replicator. The S-Video port means you can also use the optional DVD module to watch movies on your TV.

The internal speakers are excellent, and the unit also has options for line out, headphone and mic jacks beside the PC Card slots, and a hard-wired volume control.

It's heavy, but then this sort of desktop replacement machine is not really intended for use on the move – you'd use it in the office and then transport it to the next place you wanted to use it. In all, this is a well-thought out and well-constructed machine. It does well to continue the Dell tradition of building mobile computers that are almost as expandable as their desk-bound relatives, with options for Zip, SuperDisk and standard hard drives.

Our only real gripe with this machine was the keyboard, but this was minor and as most of its use will be at a desk you can easily invest in an inexpensive external keyboard for use at your base location. After sales care is in the form of Dell's standard three-year, return-to-depot warranty, but different options allow you to upgrade to a next-business-day, on-site maintenance agreement or there is an International Traveller's Warranty, which gives you access to on-site repair in 34 countries worldwide.

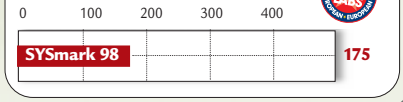
NIK RAWLINSON

PCW DETAILS

★★★★★

Price *£2,466.33 (£2,099 ex VAT)*
Contact *Dell 0870 152 4350*
www.dell.co.uk
Good points *Expandability, excellent display*
Bad points *Disappointing keyboard and it's quite heavy*
Conclusion *A good desktop replacement*

PERFORMANCE RESULTS

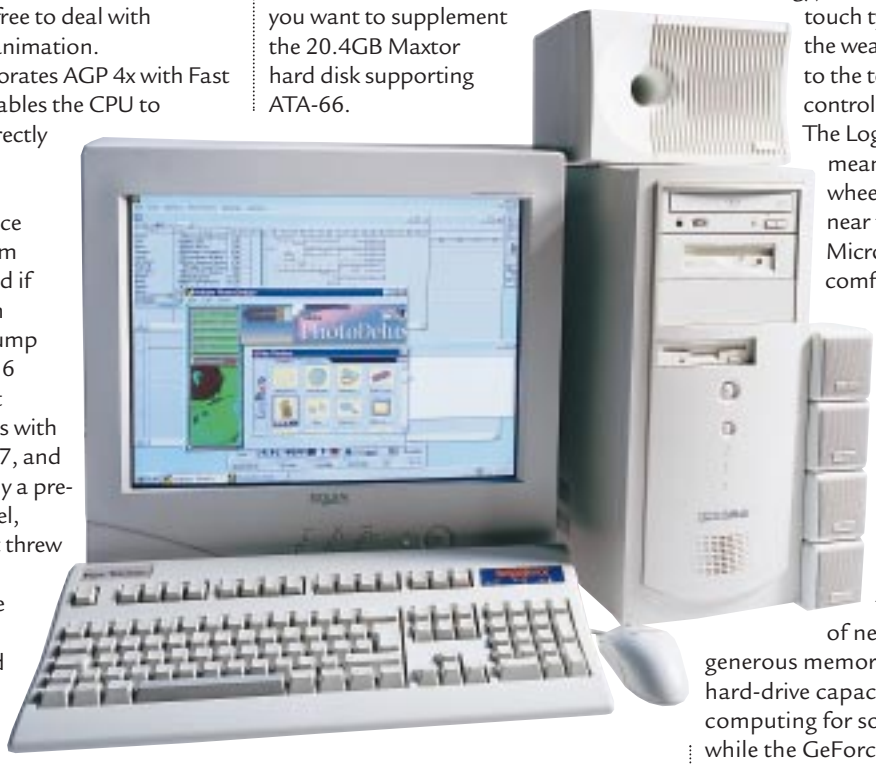


Evesham Vale GeForce 650

A sprightly processor and a cutting-edge graphics card put Evesham in the fast lane.

What makes this PC special is not so much the 650MHz Athlon processor, but the graphics card, one of the first GeForce 256 cards – codenamed NV10 – we've seen. This is the first Graphics Processing Unit (GPU), which integrates the whole 3D pipeline onto a single chip. This means it delivers from two to four times the triangle rate (15 million per second) to build up more detailed scenes, while leaving the CPU free to deal with behaviours and animation.

It also incorporates AGP 4x with Fast Writes, which enables the CPU to communicate directly with the GPU, bypassing main memory and hence maximising system performance. And if your monitor can support it, it'll pump out a 2,048x1,536 image at 75Hz. It arrived in our labs with a beta of DirectX7, and was unfortunately a pre-production model, both factors that threw up a number of problems, but we were eager to see how it performed in a real-world environment, nonetheless.



Wanting to see what the card actually looked like, not just how it performed, we tried to remove the case, which turned out to be more difficult than expected. Only after three people had tried tugging and pulling in every direction imaginable did it finally shift for us, enabling us to probe the machine's inner workings. We couldn't really call this the tidiest PC we have seen. Its internal power cables were tied into a bunch that obstructed the free memory slots and, rather than being traced around the edge of the case, the CD audio cable was dragged in front of the graphics card.

Built on a Microstar MS6167 motherboard, it sports plenty of room for expansion. Of the three DIMM slots, two remain free and 128MB of RAM fills the third. We also found two free PCIs, one free ISA and one free shared slot, even after Evesham had installed the Diamond SupraExpress 56i Pro modem and Creative Labs' SoundBlaster Live!. A nice touch was the inclusion of a socket doubler for the modem.

There's a free external 5.25in bay, and one internal 3.5in bay left vacant for a second hard drive, if you want to supplement the 20.4GB Maxtor hard disk supporting ATA-66.

Back-up storage is taken care of by the ubiquitous Zip drive. While not as capacious as the Orb drives we have seen in many Evesham machines of late, it is widely accepted – more so, even, than the higher capacity Zip250. The BIOS supports booting from the Zip and upon arrival it was given third priority behind the floppy and hard drives. Entertainment comes courtesy of a Pioneer DVD-114, so you can choose whether to while away the winter evenings in front of a film or trawling through an electronic encyclopaedia (neither of which are bundled).

The monitor is an excellent Taxan Ergovision 980 (Editor's Choice, *PCW*, November 1999, review on p208). This DiamondTron unit with an 18in viewable diagonal has no difficulty attaining a flicker free resolution of 1,600x1,200 and the extensive OSD even offers an option for altering corner colour purity. It caters for D-SUB and BNC connections and integrates one upstream and four downstream USB ports.

Key Tronic makes the supplied 'ergoforce' keyboard, with the keys benefitting from VFT (variable-force technology), which means the keys a touch typist would press with the weaker fingers are lighter to the touch than those controlled by the index fingers. The Logitech mouse, meanwhile, features a scroll wheel, but it comes nowhere near to the standard Microsoft mouse in terms of comfort. Around the back of the casing, there's the usual parallel, twin USB, two 9-pin serial and dual PS/2 ports.

All things considered, this is a well-thought out and well-built machine. Evesham should be applauded for its early adoption of new technology. The generous memory allocation and hard-drive capacity should keep you computing for some years to come, while the GeForce 256 will appeal to gamers and power users alike.

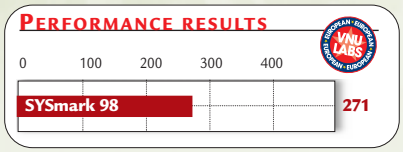
NIK RAWLINSON

PCW DETAILS

★★★★

Price *£2,446.32 (£2,099 ex VAT)*
Contact *Evesham Vale 01386 769600*
www.evesham.com
Good points *Industry-leading technology, great monitor*
Bad points *Fiddly case, disappointing mouse*
Conclusion *A first-class PC with a generous amount of space for expansion*

PERFORMANCE RESULTS



HP Pavilion 8530

A PC designed to fast-track you onto the Internet with more curves than a plate of spaghetti.

Hewlett-Packard could never be accused of building boring beige-boxed PCs, and the new models in the Pavilion range with their curvy grey and white styling and translucent smoked front covers are no exception. We took a look at the top-of-the-range 8530, which – along with the 8520 – features a 466MHz Intel Celeron processor and 64MB of RAM.

In our Lab tests, the Celeron proved a reasonable performer. With a SYSmark 98 score of 164 it was almost as impressive as a similar speed PIII. The Pavilion's graphics chip is integrated on the motherboard and has a dedicated 8MB of RAM, with access to a further 3MB of system memory. Even at this price point, many PC's come with 16 or 32MB cards, putting the Pavilion in the shade, but we still found it to be a reasonable performer, despite the fact that it kept crashing our 3DMark 99 Max bench testing software. However, if the latest 3D games are your thing, it may be worth considering the Pavilion 8520, which includes an 8MB ATi Rage Pro Card, that can always be upgraded later.

Getting started was a simple matter of matching up colour-coded cables and ports and, once up and running, it was obvious that HP has thought long and hard about how its PCs will actually be used. The top end Pavilions feature a serial port at the front of the tower case, as well as at the back, and this is ideal for connecting digital cameras. They've done the same with the USB ports. There's even a compartment, which can hold up to nine CD-ROMs on the top of the tower unit.

HP has designed the Pavilion with the Internet firmly in mind, describing the keyboard as an Internet steering wheel, but if Damon Hill was confronted with one of these, chances are he'd feel short changed. Essentially HP has added extra shortcut keys for the most popular functions and for HP's favoured websites to an ordinary keyboard. It's a nice idea, as it makes it easy for novices to get started with their new machine, and you can always customise the keys to suit your own needs later. We particularly liked the Send Fax key, which initiates the necessary wizard, as sending a fax using your PC can flummox even advanced users.

The Pavilion comes with a 56K modem and local call Internet access from BT Click. With this in mind, it seems a little strange that the keyboard shortcuts for news, weather and shopping are linked to Yahoo! web pages, but as you'll probably soon change them to your own favourites, it's no major criticism. The addition of a wheel mouse for scrolling down long web pages is always a popular choice, and once you've used one you'll soon wonder how you lived without it.

Like most 15in monitors, the one supplied proved to be quite flickery at high resolutions, but at 800x600 the picture was reasonable enough. We liked the fact that the Pavilion's speakers clip onto the side of the monitor, saving valuable desk space but, as with the graphics chip, the Pavilion's wavetable soundcard is integrated with the motherboard, making future upgrades more fiddly.

The 8.4GB hard disk that comes with the 8530 is not vast by any means, but should prove more than adequate. A fast CD-RW drive is also included, although the Pavilion 8520 comes with a 6x DVD-ROM drive and a larger 10.2GB hard disc for the same price, if you'd prefer. Expansion possibilities are fairly limited, with just two free 5.25in drive bays and one spare DIMM slot, and adding any extras would involve wading through what can only be described as a jungle of internal cabling.

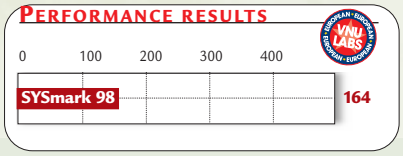
RICHARD MCPARTLAND

PCW DETAILS

★★★★

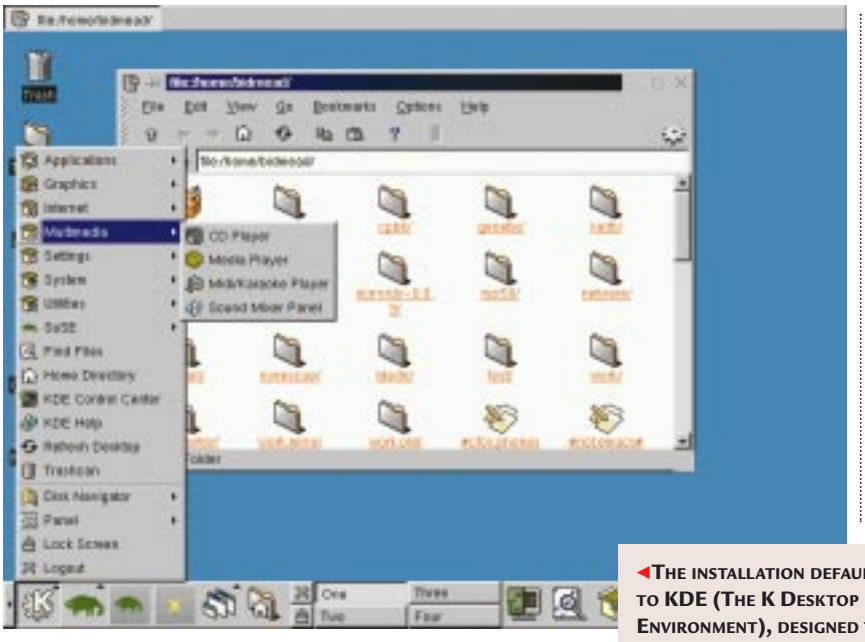
Price *£899 (£765.11 ex VAT)*
Contact *Hewlett-Packard 0990 474747*
www.hp.com
Good points *Good-looking tower case, easy to set up and use*
Bad points *Integrated sound and graphic capabilities, limited expansion potential*
Conclusion *A great-looking PC, with the emphasis firmly on ease-of-use, the Pavilion 8530 suffers slightly in terms of specification and limited expansion possibilities*

PERFORMANCE RESULTS



SuSE 6.2

SuSE has a SaX-ey configuration, a lovely YaST and is an absolute dream to install.



◀THE INSTALLATION DEFAULTS TO KDE (THE K DESKTOP ENVIRONMENT), DESIGNED TO MAKE WINDOWS USERS FEEL AT HOME

SuSE Linux is the European contender among the three leading commercial Linux distributions, which also include the US offerings, Red Hat and Caldera. If you don't want to pay upwards of £30 for a commercial Linux distribution containing CDs and manuals, you can download the entire operating system from the Internet, free of charge. To add to the fun you can also buy a cheap CD containing almost everything in one of the commercial distributions, but without the manual or support.

The newest twist is the arrival of second-tier distributors like Mandrake, which take an existing packaged distribution (in Mandrake's case it's Red Hat), add its own tweaks, and repackage the whole thing under its own brand name. Linux detractors call this multiplicity 'market confusion'. For the friends of Linux it's just free choice in a free and open market. All these roads lead to just about the same Linux.

As you might expect from its Teutonic origins, the SuSE distribution (pronounced 'ZuZ-eh') is meticulously organised. The installation, which runs like clockwork across a wide range of PC hardware, is driven by a special SuSE utility called YaST (Yet Another System Tool). YaST is distributed with source code, but under a restricted licence that lets you copy it freely, except as the basis of a SuSE-like second-tier commercial distribution, an arrangement that seems to be designed to prevent a Mandrake equivalent of SuSE. A pity, because the resonance between Mandrake and Red Hat (which of course is free to borrow Mandrake improvements and in turn improve on them) is already delivering real benefits to users.

Wisely, we think, SuSE keeps the basic installation as a simple, character-based menuing system, and backs it up with plenty of solid advice in the 400-page manual. Perhaps the trickiest part of any installation is the process of setting up the X graphical interface. For this SuSE has developed its own – unlike YaST, freely licenced – setup utility, SaX (the SuSE Advanced XF86 Configurator).

For most of the graphics cards we've come across, SaX is the slickest way of setting up your configuration. But for our initial installation of SuSE 6.2 we didn't need it, because we were putting the distribution to a much harder test. Offering the installation a completely clear patch of hard drive and letting it do its stuff is a relatively easy ordeal; the acid test is seeing if it can be intelligent about updating software that's already in place. Our last attempt to upgrade to Caldera 2.2 from its own previous release failed and we had to do a complete reload. We wondered how SuSe would cope with upgrading an older SuSE installation on an ageing Siemens Nixdorf Scenic 500 laptop. And this wasn't just the previous SuSE distribution; we were jumping across four generations from 5.2 to 6.2.

Then, 35 minutes after booting from the first of the six CD-ROMS we had a flawlessly working Linux installation. Our 1GB drive, half of it reserved for Windows, had room of course for only a tiny portion of the 1,300 applications and utilities on the CDs, and using the foolproof RPM packaging system to add and subtract applications, we're still picking our way through the main offerings. As well as free software regulars such as Apache, Samba, Gimp and a myriad of others, SuSE 6.2 includes commercial packages such as WordPerfect, StarOffice, Netscape, the ADABAS, Sybase and Informix relational databases and Applixware. Oh, and there's the IBM ViaVoice developer's kit, the Netbeans Java IDE and a time-limited trial version of VMWare.

CHRIS BIDMEAD

PCW DETAILS

★★★★

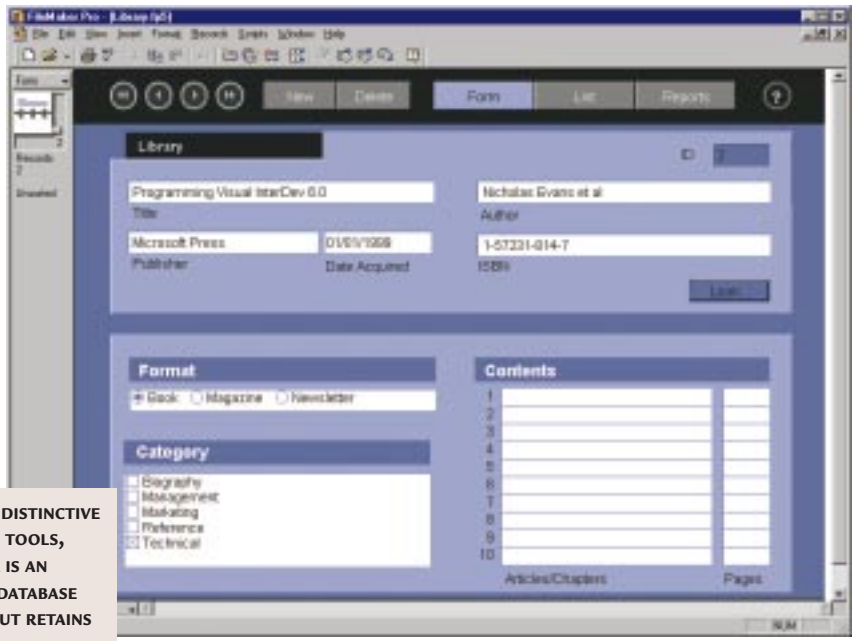
Price *£32 (£27.23 ex VAT)*
Contact *SuSE GmbH +49 991 740 5331*
www.suse.com
System requirements *Intel 486 (or equivalent) or better. 32MB of RAM (16MB without X). 300MB disk space (720MB recommended – up to 4GB if you want to install everything). There may be some incompatibilities with the very newest hardware like 3D video cards – check the Linux Hardware Compatibility HOW-TO at www.linuxdoc.org/HOWTO/Hardware-HOWTO.html.*
Good points *Simple to install distribution based on the new 2.2.x Linux kernel, with a huge number of additional utilities and applications at an excellent price*
Bad points *The YaST licence terms are non-free. The cardboard case for the six CDs doesn't hold them firmly and they tend to drop out*
Conclusion *If you're looking for an easy to install Linux distribution with a comprehensive manual and 60-day installation support by email, fax or phone, SuSE 6.2 represents a real bargain*

FileMaker 5.0

Software that makes the impenetrable world of database management approachable.

FileMaker Pro reigns supreme on the Macintosh, being almost the only choice if you want a desktop database manager. Combining ease of use with great performance and a surprising depth of features, it is everything a Mac application ought to be. For many years FileMaker has also been a Windows product. It works just like the Mac version, and is ideal for mixed-platform data sharing, but does not fit as comfortably into Windows as it does on its home platform.

Version 5.0 aims to set that right, at least from a functional point of view, by providing new ways to integrate FileMaker with other Windows applications. In a nod towards Windows, FileMaker now has floating and docking toolbars as well. It still feels Mac-like, but it's none the worse for that.



▶ WITH ITS DISTINCTIVE FORMS AND TOOLS, FILEMAKER IS AN EXCELLENT DATABASE MANAGER BUT RETAINS MAC-LIKE FEATURES EVEN ON WINDOWS

FileMaker's great strength is that it requires the minimum of database skills to achieve successful results. When you define a new database, there are only a few simple field types to contend with, and there is no need to specify indexes as FileMaker creates these for you.

Text fields are of variable length, so you do not need to guess in advance what the maximum size of a field needs to be, and there is no distinction between ordinary text fields and long memo fields. Rich formatting is supported. In FileMaker, every word is indexed if need be, for fast free-text searching. Every FileMaker database is automatically linked to a form. The intuitive query by form, where you enter the values you want to match in order to perform a search, also comes for free.

Features such as these make FileMaker the ideal database for novices. The only competitor to come close is Lotus Approach, but FileMaker is smarter and more powerful. Advanced users will find that FileMaker goes a long way before conceding to more developer-oriented rivals. FileMaker Server supports up to 250 simultaneous users. There is a scripting language that is ideal for high-level database functions, and developers can compile their own extensions by acquiring the developer version.

FileMaker also has a superb web sharing option, which uses a built-in web server for instant intranet publishing. The basic version allows up to 10 different workstations to connect per day for the price of a single licence, and uses XML and Cascading Style Sheets for the generated web pages. However, you are limited to Internet Explorer clients until Netscape 5.0 appears, but there are big gains in appearance and possible customisation.

Toolbars aside, FileMaker Pro 5.0 looks similar to its predecessors. Internally the changes are more substantial, and FileMaker is now coded in C++, apparently to make an easier transition to future Unix-like versions of the Mac OS.

There are two new features of importance to Windows users. First, a new ODBC driver lets you get at FileMaker Pro data from any ODBC-capable client application. This includes Microsoft's OLEDB provider for ODBC, so you can get at FileMaker databases from Visual Basic, Access, Microsoft Office, and in Active Server Pages – Microsoft's dynamic web publishing technology.

The other big new feature is support for COM automation. This lets you control FileMaker and read its data from automation clients, which includes most Microsoft applications and development tools such as Visual C++ and Delphi. The object model on offer is limited, but does include the ability to run FileMaker scripts, opening the door to custom solutions.

These two features may seem invisible to many FileMaker users. They are important though, since they remove one of the last objections to use of FileMaker in Windows. If you need productivity and rapid deployment, rather than the last word in power or programmability, then FileMaker Pro should be your first stop.

TIM ANDERSON

PCW DETAILS

★★★★

Price *FileMaker Pro 5 £233.83 (£199 ex VAT). Forthcoming Unlimited Web Server and Developer versions, prices not yet available*

Contact *FileMaker 0845 603 9100*
www.filemaker.co.uk

System requirements *A 486/33 with Windows 95, 98 or NT, 16MB RAM, 20MB hard disk space*

Good points *Ease of use, simple web sharing, and at last the ability to access FileMaker data from other applications*

Bad points *More expensive than the competition, has a limited scripting language, and still looks like a Mac application*

Conclusion *Still a great product, and with ODBC and COM automation hard to resist even on Windows*

MGI PhotoSuite III

A software upgrade with a web-oriented facelift and a very useful Help function.

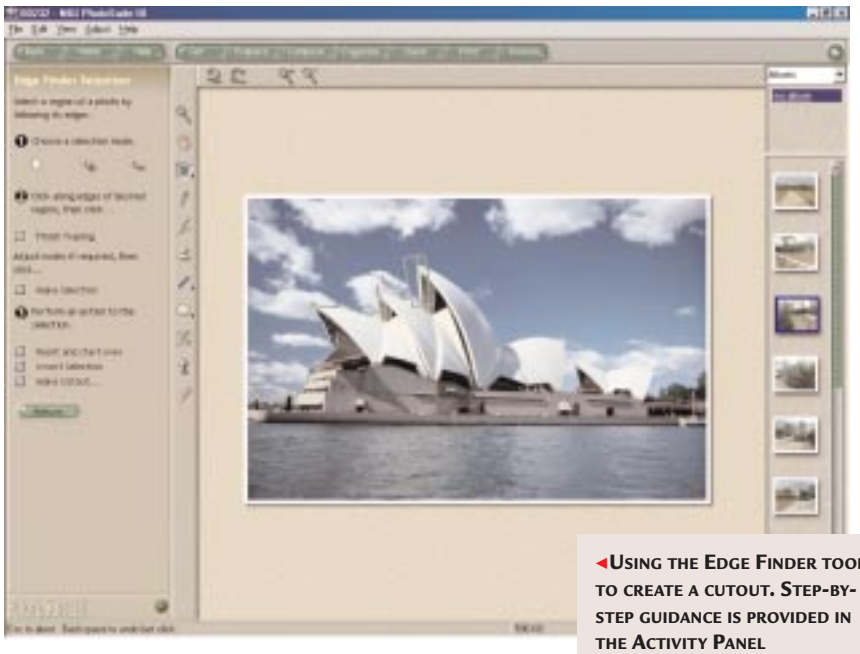
It's little more than a year since MGI revamped PhotoSuite. The complete makeover turned version 8.05 of a non-descript image editor into PhotoSuite II – a well styled, project-based photo-editing suite aimed squarely at the consumer.

PhotoSuite III is a less ambitious upgrade. The interface has been reorganised to accommodate an expanded list of tools and features – the most notable of which are Phototapestry and Stitching. The first lets you create one big picture from lots of smaller ones, the second is for combining a number of adjacent shots into a panoramic vista.

PhotoSuite III also looks different, although not necessarily better. Version II's neat buttons and icons have been replaced with a browser-style interface with a navigation bar and big green buttons that light up when your pointer rolls over them. This provides improved guidance – an activity panel to the left of the edit window takes you through the various projects and editing processes in a step-by-step fashion.

There are seven activities – Get, Prepare, Compose, Organise, Share, Print and Browse – accessed from a navigation bar above the editing window. The activity panel is context-sensitive, so, for example, when you select Get from the navigation bar the activity panel displays six buttons allowing you to choose the source of the file you want to open, be it on your hard drive, scanner, digital camera or whatever.

Having 'Got' your picture, the activity panel automatically progresses to the prepare stage, which offers seven functions including Rotate and Crop, Touch-up, Cut-outs, Special Effects, Stitching and Phototapestry. Click on any one of these and you get a further button list of options. Touch-up for example, includes options for the removal of red-eye, scratches, blemishes and wrinkles as well as touch-up brushes, filters and cloning. Select one of these and you then get a three or four-step guide.



◂USING THE EDGE FINDER TOOL TO CREATE A CUTOUT. STEP-BY-STEP GUIDANCE IS PROVIDED IN THE ACTIVITY PANEL

At each step of the process the tools you need are provided on the activity panel itself. So, when you clone you are first told to click and set the origin, then choose a brush. A slider is provided for adjusting the brush size and opacity and clicking on a palette provides differently shaped and feathered brushes. When you've finished, clicking return takes you back to the previous menu – in this case the various Touch-up options.

If you need more guidance, the Help button on the navigation bar opens a separate Help window, which opens on a page relevant to the activity. So, if you're trying to clone and get stuck, selecting Help takes you to the clone page.

If you're feeling confident you can jump straight in by selecting a tool and getting on with it. In this case the activity panel provides the same appropriate step-by-step help for the selected tool.

Compose is where you'll find projects such as greetings cards, invitations and calendars and is probably the weakest part of PhotoSuite III. While the projects are simple to complete, the collection of templates is, by today's standards, thin. To include only one template for a birthday party invitation, which is probably the most likely use of this kind of thing, is just daft.

PhotoSuite succeeds much better when it comes to organising and sharing photos. It provides straightforward tools for organising pictures into albums and you can present slideshows with fancy transitions between slides either automatically, or using a VCR-style control panel. These features will be of great value to digital camera users as will the direct input support for certain models of Kodak, Sanyo, Agfa, Olympus and Epson digital cameras. Owners of other models can use the conventional twain route.

If you're using an ATi RagePro graphics card, you'll need to get up-to-date drivers from the ATi website. Given the ubiquity of the ATi card this will be a nuisance to many users and hopefully MGI will fix the bug soon.

KEN MCMAHON

PCW DETAILS

★★★

Price *£49 (£42.55 ex VAT)*
Contact *MGI Software 01628 680227*
www.mgisoft.com
System requirements *PII 166Mhz, Win95, 98 or NT4, 32MB RAM, 80MB disk space*
Good points *New Tapestry and Stitch features, album and slideshow facilities*
Bad points *Crashes with some ATi graphics cards, poor collection of project templates*
Conclusion *Unless you really need the new features, stick with version II – it's only £29.99*

Emagic Logic Audio Gold 4.0

Could this be a case of the sequel being better than the original? It's music to the ears.

Ever since Logic migrated from the Atari ST, the program's development on PC has lagged several versions behind the Mac. This is set to change with the release of version 4.0, though. Not only has the package undergone extensive cosmetic surgery, its code has been rewritten to bring both platforms in line. While we'll be looking at what Logic Audio Gold now has to offer, note that MicroLogic, Logic Audio Silver and Platinum have had much the same treatment.

Behind that cushy facelift are scores of improvements, both to the user interface and to the program's ever-growing arsenal of features. This is first apparent in the Arrange window. New colours and casual design tweaks give the package a more modern feel, but more significant is that the menu structure has had a major reshuffle. The purpose of this is to group related commands in the same place. For example, there is a now a global Audio menu from where you can access the audio mixer, sample editor, audio-input monitoring and audio preferences. It's much more logical this way!

The transport bar has also been reworked. Besides a new look, multiple instances can be opened simultaneously and configured to display any transport function, such as SMPTE time position, MIDI activity and current locator points. Additionally, the bar ruler across the top of the screen now changes colour to indicate transport mode. When record is activated it turns red, yellow indicates solo and blue is for external sync. In the track list there is a new Record Enable button. This allows several instruments (audio or MIDI) to be recorded to separate tracks simultaneously.

Emagic has clearly gone to work with the colours here, but these are most useful in the Matrix editor. It's now possible to view velocity values and different objects in full colour. This makes a huge difference when editing multiple parts, making it clearer to see which events belong to which tracks.

▶LOGIC IN FULL EFFECT. NOTE THE DIFFERENT TRACK SIZES IN THE ARRANGE WINDOW

Another welcome improvement is that individual tracks can be resized in the Arrange window. This enables you, for example, to zoom into an audio track to enter Hyperdraw envelopes while viewing other tracks at regular size.

Logic now supports 24bit/96KHz operation and is compatible with Steinberg's Audio System Input/Output (ASIO) standard. If your sound card comes with ASIO drivers, latency (the time it takes for audio to arrive at your speakers) is vastly reduced. Although figures vary for different sound cards, Terratec's EWS88MT ASIO driver has a latency of just 8ms compared with 750ms for the standard MME one. There was also talk of VST plug-in support for this release, but it hasn't been implemented yet. Emagic says it's working on it.

Logic Gold now comes with 26 audio effects. Some are rewrites of old plug-ins that use fewer processor overheads, while others are new altogether. These include a noise gate, compressor, expander, overdrive, reverb and tape delay. The graphics are visually stunning and, in many cases, the layout of parameters are just as they would be on a real hardware device. All parameters can be automated alongside audio and MIDI-mixer tracks. However, the effects are not DirectX or VST compatible and cannot be used inside other applications.

We've spent three days playing with this release and must conclude that the enhancements (both visual and functional) make the program much easier and clearer to use. We suspect most users will admire the new look, but should you prefer the old style the option is available via the Settings menu. For us, though, the real joy of 4.0 is the new effects – they sound great. The only real problem we came across was when using ASIO drivers. On several occasions we got the message 'failed to synchronise audio to MIDI', which stops play. A call to tech support proved inconclusive, so for the time being we'll be using the slower MME drivers.

STEVEN HELSTRIP

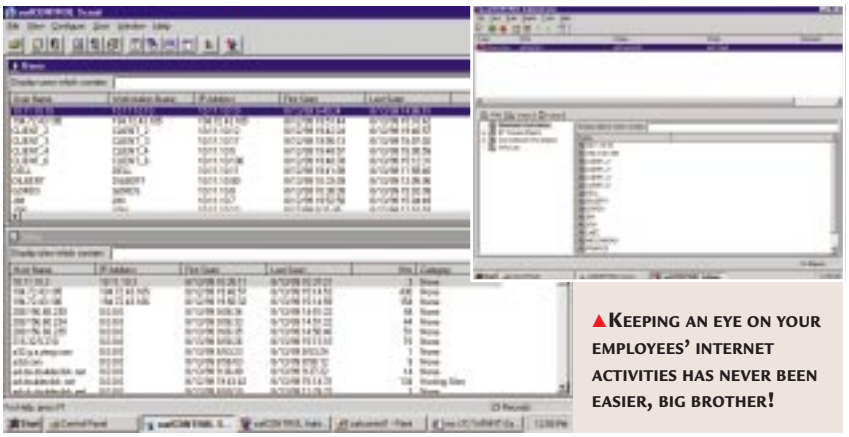
PCW DETAILS

★★★★

Price *£399 (£340 ex VAT); Upgrade from 3.5 £69 (£58.72 ex VAT)*
Contact *Sound Technology 01462 480 000 www.emagic.de*
System requirements *Pentium II processor, 128MB RAM, audio and MIDI capability, fast hard disk*
Good points *Pro-quality effects, powerful sequencing features, full automation, highly configurable*
Bad points *No support for VST plug-ins (yet), occasional audio drop-outs*
Conclusion *If you're a dedicated Logic user, version 4.0 is an essential purchase. Well worth the £69 upgrade*

JSB Surfcontrol and Netsiren UC2

Stop people seeing what they shouldn't and wasting time at work and at home.



▲KEEPING AN EYE ON YOUR EMPLOYEES' INTERNET ACTIVITIES HAS NEVER BEEN EASIER, BIG BROTHER!

The Internet is a great source of information, but it serves as a distraction from work, and a potential source of illicit material in the home. What is needed are tools to help enforce a sensible Internet policy, and we have two such products here: one for the home, and one for work.

Surf Control from JSB is aimed at businesses and restricts Internet access, either for certain sites, or people. Sounds clever, but how does it work? It's quite simple, once you understand the basics. Ethernet networks work on the basis that when a person transmits, everybody else on the same segment receives a copy of that packet. A segment contains every computer connected to the same hub. Switches split the network into these different segments.

Upon receiving a packet your network card usually dumps data it was not meant to have. Surf Control, however, keeps every packet which arrives (Promiscuous mode), allowing it to monitor Internet activity within the segment. Should it find a request for a website it should be blocking, it sends out a cancel request to the contacted web server, and a message to the client who initiated the session informing them that access is denied.

Installation is very easy: simply insert the CD, enter the serial number and reboot, and everything should be up and running. From this point on control is achieved through two programs: the monitor, and the rules administrator. The monitor allows you to view a list of users who have accessed the web, and websites accessed. You can select who to monitor and who to ignore.

Real control is through the rules administrator, which is where you set up access. This is really a matter of dragging and dropping users, and websites, and selecting 'allow' or 'deny'. It's a simple system, but quite powerful in what it allows you to do. The only real trouble that we had was in restricting access to workstations based on their NetBIOS names. It's a competent enough system, although only really recommended for SMEs as higher network traffic could be a problem for the way the system works.

As a comparison Netsiren's UC2 serves as an aid to parents. The aim of the game here is no longer prevention of access to material, but monitoring of what has been accessed. The hope is that parents can then view what has been going on, and talk to their children about what they have been viewing.

The program is painless to install, and starts working immediately on reboot. The only program that parents will then ever need load is the password-protected application to view everything that has been monitored. The monitor allows the user to select a type of content, such as web, ftp, mail, and see what transactions have taken place by presenting the user with, for example, a list of files accessed over the Internet. Should you then find something of interest, you can simply select a file while UC2 displays what it is in another window. For this to work you'll need to be connected to the Internet as UC2 only stores a list of sites visited, not all the files, which saves wasting disk space. In fact, the only thing that UC2 stores in its entirety are emails. The usual keyword search tools are included, and you can call up statistics on which web page was visited the most.

The software isn't infallible, and a smart child could get round it, but for the most part it serves both to warn children that you know what is going on, and to give you some peace of mind knowing what your children are looking at. Its simplicity makes it worth a look.

DAVID LUDLOW

PCW DETAILS

JSB Surfcontrol

★★★★

Price *£1,404.13 (£1,195 ex VAT)*
Contact *JSB 01260 296 250*
www.jsb.com
System requirements *Microsoft Windows NT4 (server or workstation), Pentium 200MHz, 64MB of RAM, 1GB of free disk space, Promiscuous mode network card*
Good points *Easy to install. Simple rules-based system that can give a lot of power*
Bad points *Rules administrator can be annoying when defining access privileges*
Conclusion *Good overall product that keeps your employees away from sites they shouldn't be visiting. Better suited to smaller networks, as a standard server could have trouble coping with large amounts of traffic*

Netsiren UC2

★★★★

Price *£34.08 (£29 ex VAT)*
Contact *Netsiren 0207 423 0523*
www.netsiren.com
System requirements *Microsoft Windows 95/98, Pentium 100MHz (Pentium 233MHz recommended), 16MB of RAM (32MB recommended), Microsoft Internet Explorer 4.0 or higher installed*
Good points *Simple to use, the install takes care of everything for you, and no configuration is needed*
Bad points *Could be bypassed*
Conclusion *Allows you to verify where your children have been, while the threat of being monitored should keep them away from sites they shouldn't be looking at. Definitely worth a go*

Removable media *vs* removable hard disk

Should your PC end up on the operating table what can you do to ensure a full data recovery?

The price of hard disks is dropping fast and their sizes are increasing with equal speed, so for most users, storage is no longer a problem. You can easily fit all the applications and data you need onto your hard disk, but how safe do you feel keeping all your metaphorical eggs in one basket?

Let's face it, there is a myriad accidents that could befall your data. The hard drive could fail for many different reasons, your PC could be stolen or your building could be hit by flood or fire. If something happened to your data, how hard would it hit you? Home users will doubtless be gutted, but if you run a business, data loss could mean substantial financial loss. A recent Veritas survey in the US estimated that 96 per cent of small to medium-sized businesses never recovered from a catastrophic data loss, lasting only a few months before going bankrupt.

So the question is not whether you should back up, but how. Over the past few years several removable media drives have come onto the market and, for many users, these are an obvious choice when backing up and archiving data. Iomega Zip and Jaz drives, CD-R and tape drives can all be used for backing up and archiving data, although only write-once media like CD-Rs are admissible in court as evidence.

The argument for using removable media for backup is simple. The disks can be removed to a safe place after each backup, so should there be, for example, a fire in your building, you will have the backup disks stored in a fire-proof safe or in a separate building altogether. This way, whether the disaster is as mild as a hard disk failure or as severe as your entire premises burning to the ground, you still have your data and can keep your business running.

Most removable media drives only have space to store the data, especially given the increasing size of applications. Office 2000 Standard Edition will take up 189MB, SBE needs 360MB, Professional 391MB and Premium a massive 526MB if you install the complete package from all three CDs. Even Photoshop 5.5 gobbles up 125MB

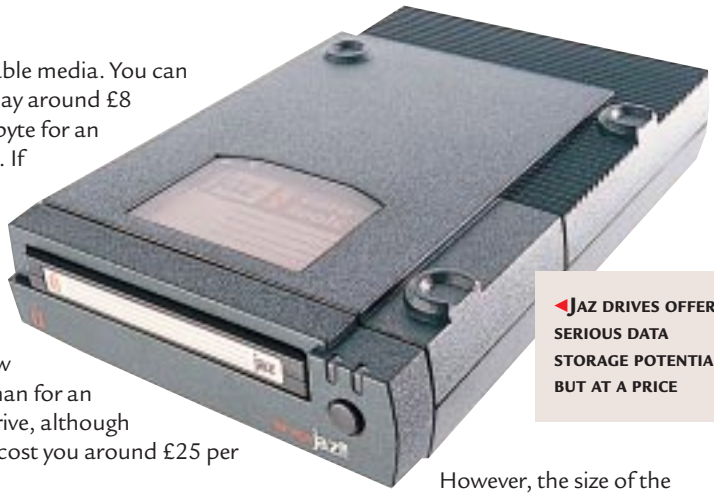
while Windows 98 eats up to 315MB, depending on the configuration of your machine. The files created by these bloatware applications also grow increasingly in size. For example, with regular use of Photoshop you can quickly build up several hundred megabytes worth of files. Creating a whole image of your hard disk is often not practicable using removable media, and backing up your data alone will still require a good amount of storage space.

In the event of a hard disk failure the first step to recovery using removable storage media is getting hold of and fitting a new hard disk. You will then have to reinstall Windows and all your applications before you can even contemplate restoring your data. In most cases this means long periods of non-productivity for you and your staff waiting for the new machine to be ready and the data restored, and when time means money, wasted hours eat into company profits.

With the price of hard drives dropping so rapidly, could you not use a removable hard drive for backup instead? Any hard disk can be turned into a removable disk by fitting it in a removable case. This sits in a 5.25in front-facing bay and allows the drive to be pulled in and out of the case just as you would take removable drive media in and out of the drive. A removable hard disk casing kit costs just £8 ex VAT from Insight <www.insight.com/uk> and allows you to swap a hard drive in and out of the machine quickly and easily. In fact to all intents and purposes it then becomes a removable media.

Creating a back-up image is as easy as creating a backup of your data and several utilities exist which will copy the entire contents of your hard drive, including all system information, from one drive to another. Drive Image from Powerquest will do just this for you in one very simple movement. Should you have a hard disk failure, the old hard disk can be replaced with the backup drive by simply swapping one drive for the other, and you can then use the drive immediately, with access to all your files without having to go through the whole system rebuilding rigmarole that would be required with removable media disks.

There is now a convincing cost argument in favour of hard disks instead of other removable media. You can now expect to pay around £8 ex VAT per gigabyte for an EIDE hard drive. If you go for an ATA-66 drive, you will not pay a huge premium – just a matter of a few pounds more than for an older ATA-33 drive, although SCSI drives will cost you around £25 per gigabyte.



◀ JAZ DRIVES OFFER SERIOUS DATA STORAGE POTENTIAL, BUT AT A PRICE

Compare this with prices for removable media disks. An internal ATAPI 250MB Iomega Zip drive costs just £100, but a single disk costs £13, over 16 times more expensive than hard drives per megabyte. A single 2GB Jaz disk costs £65 ex VAT and £159 for a three-pack, more per gigabyte than a SCSI hard drive. Jaz drives will cost you around £215. Tape is equally expensive, costing between £30 and £42 ex VAT for Colorado media. You also have to factor in the price of the drive itself. Hewlett-Packard Colorado tape drives with a 5GB maximum capacity can be bought for around £100 – about the same price as a Zip drive.

Zip drives are too small to be used for anything but saving the odd file

Size-wise hard disks are also a good bet. Current hard drives are huge, with SCSI hard drives coming in sizes up to 36GB and ATA-66 drives available up to 37GB. While you can get huge tape drives, these are infinitely more expensive than a hard drive, with 70GB drives costing well over £3,000.

However, the size of the backup media you need will depend greatly on the kind of installation you have. If you have a 4GB hard drive that is groaningly overloaded, you will need a large media type to back up onto, unless you want to have to wait around and swap disks a few times throughout the backup process. Here we are looking at a hard drive or tape.

However, if you have less than 2GB to back up then something like a Jaz drive would be a good bet, as you could fit a full disk image onto one disk. However, if you use a Jaz drive on a larger installation, you will have to swap disks or save your data only, meaning a longer system reinstallation if the worst comes to the worst. Zip drives are frankly far too small to be used for anything but saving the odd file and are certainly not big enough for full bodied backup.

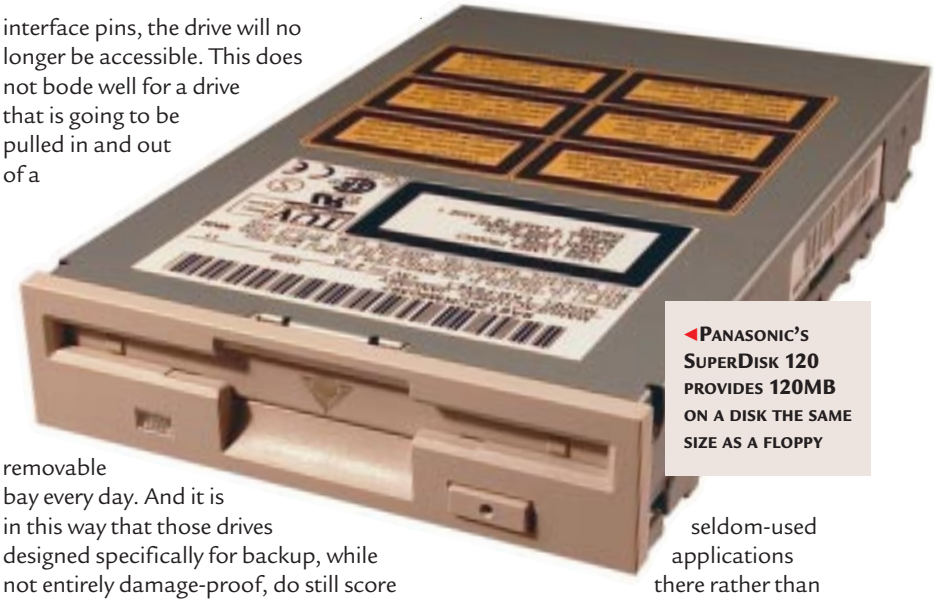
If you are going to be backing up your data on regular basis, then speed is of the essence, especially if the removable

▼ THE RISK OF THE HARD DISK: LOW COST AND CAPACITY VERSUS BRITTLENESS

disk is then going to be taken to another building or locked in a safe overnight. After all, you would not want the backup disk still sitting in its drive if the building went up in smoke. Zip drives, particularly the parallel port versions, and CD-R drives, are not particularly fast and, of course, you need to be there while they back up, especially with smaller 100MB Zip drives, where the media will have to be changed several times before a complete backup has finished. Jaz drives reach speeds similar to hard drives, however and, provided the entire backup will fit on one disk, you will not have to sit there waiting to swap disks.

Finally the life of the disk has to be taken into account. With careful handling a hard disk should have a longer life span than any of the removable media types. Obviously, CD-R can only be written to once, while CD-RW can only be written to a few times over. Iomega quotes a shelf life of 10 years for Zip disks, although as with any floppy-type media there is a finite number of times you can write to the disk before it starts to deteriorate. Most tape drives can be written to just 80-200 times. Compare this to the average hard disk to which you read and write many thousands of times every day.

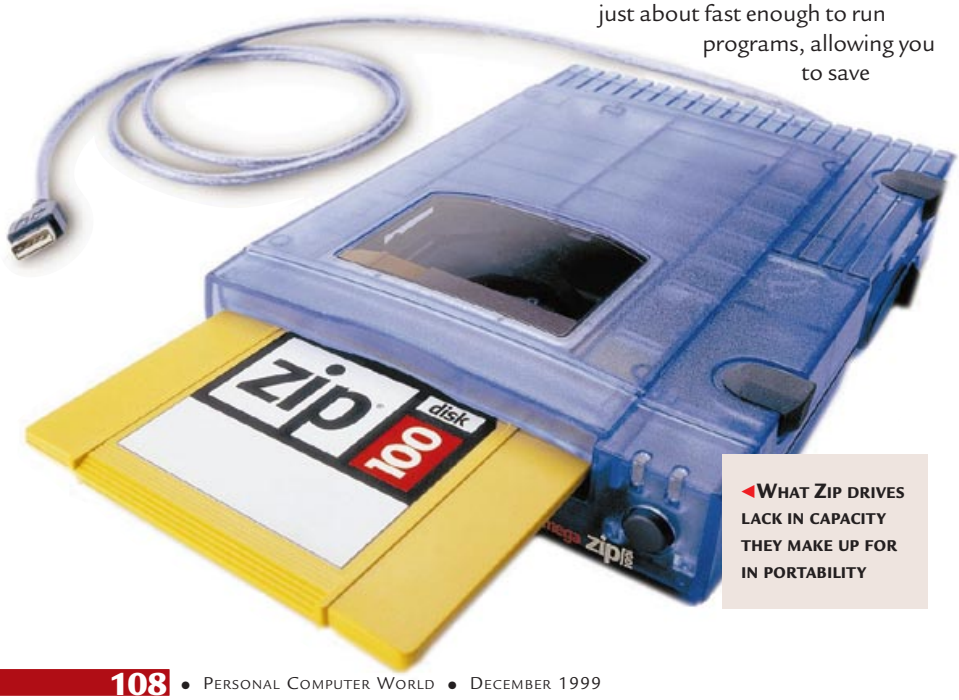
So from a cost, space and speed point of view hard disks win out every time. However, there is one huge problem with using them as a back-up device that is going to be taken in and out of a machine – their fragility. The very fact that hard drives have to be backed up at all speaks volumes about this. The disks themselves are wafer thin and can be easily damaged if knocked too hard. And if you damage any of the interface pins, the drive will no longer be accessible. This does not bode well for a drive that is going to be pulled in and out of a removable bay every day. And it is in this way that those drives designed specifically for backup, while not entirely damage-proof, do still score points over hard disks.



◀PANASONIC'S SUPERDISK 120 PROVIDES 120MB ON A DISK THE SAME SIZE AS A FLOPPY

There are also other reasons for having Zip, CD-R and tape drives as part of your system. Zip and CD-R disks are useful not only for backing up data, but also for transferring larger files from one computer to another. So you can give large database files to your colleagues, or take your PowerPoint presentation to a remote venue without having to lug a notebook with you, then leave the presentation with your clients afterwards. You can create boot disks on Zip drives to solve any virus problems, and it would also be useful to keep a copy of the drivers you need on this same Zip disk to recover from operating system foul-ups.

Jaz drives with a 2GB capacity can be used to do a complete data backup but can also be used to store applications not used regularly. As they are intended to run like hard drives, Jaz drives are just about fast enough to run programs, allowing you to save seldom-used applications there rather than on the hard drive. And, of course, as with Zip drives, you can also boot from Jaz drives, so they can be used to create recovery disks for your system to solve any virus or operating system problems.



◀WHAT ZIP DRIVES LACK IN CAPACITY THEY MAKE UP FOR IN PORTABILITY

Tape drives, meanwhile, where capacity can go up to 70GB, remain excellent for backup and for archiving data. Hewlett-Packard's Colorado drives, with maximum capacities of 5GB, 8GB and 14GB cost £119, £134 and £182 ex VAT respectively and all now feature One Button Disaster Recovery, which does exactly what it says – restores your entire system at the touch of a button, so apart from the time spent adding in a new hard drive to your PC, recovery should be pretty quick.

Perhaps the ideal scenario would be to use a combination of hard disk and removable storage to fulfil your back-up and restore needs. This will mean two back-up routines, however, first mirroring the image of your hard drive to a removable hard disk maybe once every week or two weeks, copying your operating system, applications and all your data to that point. Secondly, you should back up your most recent data on a daily basis to a removable media disk. This should shorten the daily routine.

Should the unthinkable happen you will have a new hard drive ready, with an image of your operating system and applications and most of your data which can be quickly installed. This will give you a working system so you will not lose valuable working time. You will then be able to restore your most recent data from a removable drive, making sure that you have a fully working and up-to-date system within an hour or so.

ADELE DYER

ILLUSTRATION GAVIN REECE

Part exchange

Is your PC getting a bit long in the tooth? Does it struggle with Office 2000 and can it cope with the latest games? You have two basic choices – upgrade or chuck it out and get a new machine. Upgrading is often the better option. You may not need to replace all your components to have a PC with enough power to run any applications you want. So it makes sense to replace only those parts of the machine that need attention, saving yourself a good deal of money in the process.

To see how much we could do to an old PC, we took a PII 233, reviewed in *PCW* in August 1997, with an FX motherboard, 64MB of RAM on 72-pin SIMMS, and a 4.3GB hard drive and looked for ways to improve its key components. It had a Matrox Millennium graphics card with 8MB of RAM, 12x CD-ROM drive and 33.6Kbit/sec modem, all of which could also be replaced. The only component we agreed to keep was the 17in Iiyama aperture grille monitor.

We knew that some people would want to spend more than others, so we set five price points: £100, £200, £300, £400 and £500. We then threw three *PCW* writers, Adele Dyer, Riyad Emeran and Will Head, into the mix to see what solutions they would come up with.

All prices are from the October issue of *PCW*, so by the time you read this you might be able to get the components for less. Unless otherwise stated all products are from Dabs Direct at www.dabs.com and all prices are ex VAT.

If you're being driven mad trying to navigate the upgrading course, here's *PCW*'s version of *Top Gear* to help you add value to your PC whatever your budget.

Adele's Choice

There are some fundamental problems with the machine we chose. It has a slow processor by today's standards, and the RAM could also do with an upgrade, but upgrading these would involve both a change of motherboard and spending a great deal of money. So the changes you could make at this price are less speed-orientated and aimed more at improving the overall performance of the machine.

The hard disk is relatively small at 4.3GB and for just £95 you could easily buy a 13GB drive to replace it. However, this machine also has no form of removable storage and so another good option would be a 250MB internal ATAPI Zip drive for £106.

However I did not opt for either of these options in the end. Instead I decided to buy a self-memory modem, which will store incoming faxes and voice messages even when I do not have my PC switched on. There are several good ones on the market: Pace had the excellent 56 Solo, but as Pace has now gone to the great modem manufacturer in the sky, my next choice is the 56K Professional Message Modem from 3Com. It has 4MB of memory, a remote retrieval facility and is easy to use.

Riyad's Choice

With a configuration such as this PC's, the first thing you have to change is the motherboard. The old 440FX-based motherboards provide no upgrade potential and don't support AGP, UDMA33/66 standards or SDRAM. With these kinds of limitations, the sooner you can upgrade the system backbone the better. But if you only have £100 to play with, you won't be able to upgrade to a BX board and still afford memory. Worry not, the answer is at hand, because for a mere £55 you can buy a TMC Super Socket 7 motherboard with 1MB of cache on board. This little beauty has both SIMM and DIMM sockets so you can carry on using your existing memory, but you'll have the option to upgrade to SDRAM later. Obviously your 233MHz Pentium II won't fit in this board, so you'll need to replace the CPU, and for the incredible price of only £42 you can get a 450MHz AMD K6-2 processor.

▲THE AMD K6-2 PROCESSOR WILL SHIFT YOU UP A FEW GEARS

With this new setup you'll see significant performance increases over the old configuration, and the upgrade path is greatly improved. With the inclusion of an AGP slot your next purchase could be a decent 3D graphics card to complement the 3DNow! instructions embedded on the CPU.

▲THE 3COM 56K PROFESSIONAL MESSAGE MODEM WILL KEEP YOUR PC IN A RECEPTIVE MOOD

Will's Choice

£100 isn't much to play with, just upgrading the operating system to Windows 98 would leave you with only £41 and this is before even touching the hardware. There is another way however – the Linux way. Since Linux is free to reproduce and distribute you can pick up a copy of Redhat 6.0 with no manuals or support for £2.98, leaving you with £97.02 to spend. Linux is also a far more efficient operating system, so you should find that with this configuration the machine should fly.

Linux was made to network, and does it very well, so the obvious option would be to spend the rest of the money on the tools needed to connect the machine up to others. To start with you'll have to get some network cards. For a basic startup network, I opted for two 3Com RJ45 PCI cards coming in at £25 each. You'll also need a hub to connect the cards together and 3Com's TP4 four-port hub at £28 is enough to get us started. Finally you'll need something to link it all together – two 5m cables at £7 each brings the grand total for our network starter kit to £94.98.

PCW DETAILS

ADELE's CHOICE

3Com 56K Professional Message Modem
Price *£116.32 (£99 ex VAT)*

RIYAD'S CHOICE

TMC TI5VG+
Price *£64.63 (£55 ex VAT)*
AMD K6-2 450
Price *£49.35 (£42 ex VAT)*

WILL'S CHOICE

3Com RJ45 PCI Card
Price *£29.37 (£25 ex VAT)*
3Com TP4 4x 10MB Hub
Price *£32.90 (£28 ex VAT)*
5m RJ45 Cable
Price *£8.22 (£7 ex VAT)*
Redhat 6.0 CD
Price *£3.50 (£2.98 ex VAT)*
Contact *Aquila Vision 01274 775117*
www.aquila-vision.co.uk

Adele's Choice

For £200, you could start to replace core components. Personally, I spend a lot of time on the internet and find modem dial-up connections a pain in the proverbial neck. So for my £200 I would sort myself out with a decent ISDN connection.

▼THE BILLION PIPAC PCI COULD TERMINALLY IMPROVE YOUR PC

BT has two tariffs for ISDN: Home Highway is for residential customers and Business Highway, funnily enough, is for business users. Both connect at 128Kbit/sec. The conversion charge for both Home Highway and Business Highway, that is from an ordinary phone line to ISDN, is £99. However at the time of writing BT had a half-price offer on both services, bringing the prices for both down to £49. Line rental for the services is charged in many different ways. Monthly line rental for Home Highway is £40 inc VAT per month, which includes £15 of calls. Business Highway charges rental quarterly at £133.75, which includes £57.50 worth of calls.

In addition you will need a decent terminal adaptor (TA). While TAs were quite expensive a few years ago, you can now pick up a good one for less than £50. In our August group test of comms hardware, the Editor's Choice for TAs went to the Billion BIPAC PCI which costs just £29. It has all the functionality you will need and is easy to install.

PCW DETAILS

ADELE's CHOICE

BT Home/Business Highway
Price *Home Highway conversion charge £116.33 (£99 ex VAT), offer price £57.58 (£49 ex VAT), line rental £40 (£34.04 ex VAT) per month*
Business Highway conversion charge £116.33 (£99 ex VAT), offer price £57.58 (£49 ex VAT), £157.16 (£133.75 ex VAT) quarterly rental
Contact *BT www. bt.com*
Billion BIPAC PCI
Price *£35 (£29 ex VAT)*
Contact *Eurotech 01189 810011*
www.billion.com.tw

RIYAD'S CHOICE

SuperMicro BX Board
Price *£79 (£68 ex VAT)*
128MB SDRAM
Price *£78.73 (£67 ex VAT)*
Voodoo3 3000
Price *£88.13 (£75 ex VAT)*

WILL'S CHOICE

Abit BM6 Socket 370 Motherboard
Price *£69.32 (£59 ex VAT)*
433MHz Celeron Processor
Price *£77.55 (£66 ex VAT)*
128MB PC66 SDRAM
Price *£81.07 (£69 ex VAT)*

Riyad's Choice

With £200 you could stick to the Slot 1 form factor and hang onto the 233MHz Pentium II until you can afford something faster. Going for a 440BX motherboard gives you masses of upgrade potential, with the option to fit a Pentium III 600 or something even faster later on. For £68 you can buy a SuperMicro P6SBA motherboard, giving you access to an AGP slot, DIMM slots for fast SDRAM memory and support for UDMA33 hard disks. With lots of money left to play with you can fill one of the three DIMM sockets with 128MB of PC100 SDRAM for only £67. As well as providing twice the amount of memory, you'll get better overall performance from the faster RAM technology.

Even though the 233MHz Pentium II only runs with an FSB of 66MHz, the PC100 adds to your future-proofing. With the last £75 you can fill the AGP slot on the new motherboard with a 3dfx Voodoo3 3000 graphics card. This will improve the 3D performance of the machine and allow you to play some of the latest games you've been missing out on.

Will's Choice

For £200 it is possible to give the computer a considerable performance boost by upgrading the processor. However, due to the restrictions of the FX motherboard, it will also be necessary to replace the motherboard and memory with newer components as well. While £200 won't even cover the cost of the top-end processors available, there are plenty of reasonable low-cost components on the market. Of the offerings available from AMD, Cyrix and Intel, Intel's Celeron chip seems to offer the best solution, providing good performance for this price.

▲SOLD ON CELERON – QUITE A FEW BANGS FOR YOUR BUCKS

The Celeron processor means a Socket 370 motherboard, and again there are a lot of choices in this area. Abit produces a large array of Socket 370 motherboards, including the BP6 which will support two Celerons in a parallel configuration. Its BM6 model, based on Intel's BX chipset, provides a good solution for the money at £59. While 64MB of RAM would be OK, more is always better so I decided to sacrifice a little processor power and go for 128MB at £69. This meant there was enough cash left to purchase a 433MHz Celeron, costing £66, putting the total upgrade price at £194.

Adele's Choice

If there is one thing no PC user can do without it is storage. New applications are ever more bloated, and if you have spent the last two years trying out the software on *PCW*'s cover CD, the chances are you could do with a little extra room. Neither should you forget some kind of backup disk, such as a Zip or Jaz drive, or even a tape drive.

▲ ENJOY THE SLUMP IN THE PRICE OF HARD DISK DRIVES WHILE YOU CAN

Hard disk prices are incredibly low and a 10GB drive is not going to break the bank. We found a 10.2GB Quantum Fireball for just £88.

The same goes for removable storage. An internal 250MB Zip drive can now be bought for as little as £106, so there is no excuse for not backing up at least your documents.

Finally you could add in a CD-RW drive or DVD drive. Creative's DVD Encore comes with an MPEG card to take care of MPEG decompression, although you may prefer to wait for DVD until you have a faster processor. However, if you want to share data with friends and colleagues, a CD-RW is the best answer, as everyone has a CD drive, but not everyone has a Zip drive.

PCW DETAILS

ADELE's CHOICE

Iomega Zip – internal 250MB
Price *£124.55 (£106 ex VAT)*
CD-RW – HP SureStore 7570i CD-RW
Price *£122.20 (£104 ex VAT)*
Hard drive – Quantum Fireball CX – 10.2GB
Price *£103.40 (£88 ex VAT)*

RIYAD'S CHOICE

TMC TI5VG+
Price *£64.64 (£55 ex VAT)*
AMD K6-III 450
Price *£123.38 (£105 ex VAT)*
ATI Rage Fury
Price *£92.83 (£79 ex VAT)*
128MB SDRAM
Price *£78.73 (£67 ex VAT)*

WILL'S CHOICE

ATI All in Wonder
Price *£158.62 (£135 ex VAT)*
32MB EDO SIMMs
Price *£35.25 (£30 ex VAT)*
Toshiba 6x DVD-ROM
Price *£75.20 (£64 ex VAT)*

Riyad's Choice

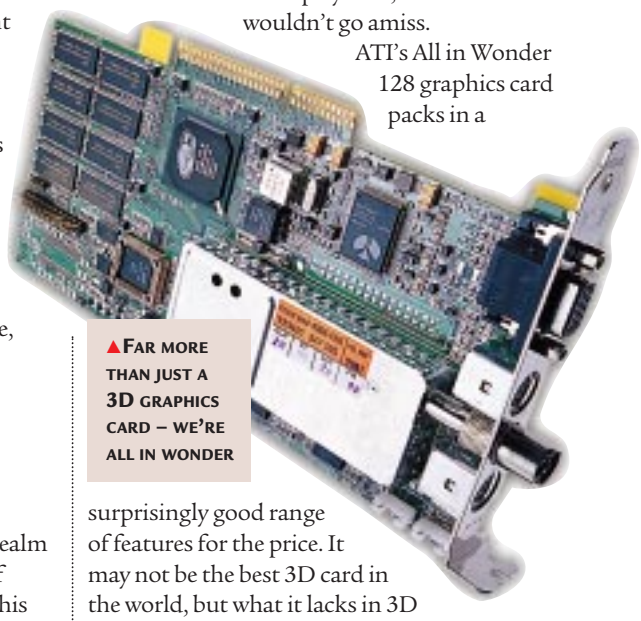
Now we're hitting the realm of serious upgrading. If you're going to spend this kind of money you can completely change the face of your PC. As with the previous two price points the motherboard has to go. We're going to go for an AMD solution again, but with a bit more money to play with we can make it a bit more interesting.

We'll start with the same TMC motherboard as before with 1MB of cache, although this time the cache will be Level 3 instead of Level 2 as we're going to a K6-III CPU. The K6-III has 64KB of Level 1 cache and 256KB of Level 2 both on the chip itself, so the cache on the motherboard operates as Level 3 cache.

We'll go for a 450MHz K6-III CPU which comes in at a bargain price of only £105. There is a 500MHz version available, but this would take us a little too far over our budget. Like the K6-2, the K6-III incorporates AMD's 3DNow! instructions, so a 3D graphics card is in order. Although our budget restricts us a little in this area, we can still stretch to a 32MB ATi Rage Fury. Even though we can use the older memory in this board, we're better off ditching it in favour of 128MB of SDRAM at £67.

Will's Choice

Computers are slowly moving further from the office and closer to the living room, being seen as home entertainment devices as well as work machines. In order to give this machine a multimedia makeover all you'll need is a good graphics card, TV Tuner, DVD-ROM and, to ensure smooth DVD playback, a little extra RAM wouldn't go amiss.



▲ FAR MORE THAN JUST A 3D GRAPHICS CARD – WE'RE ALL IN WONDER

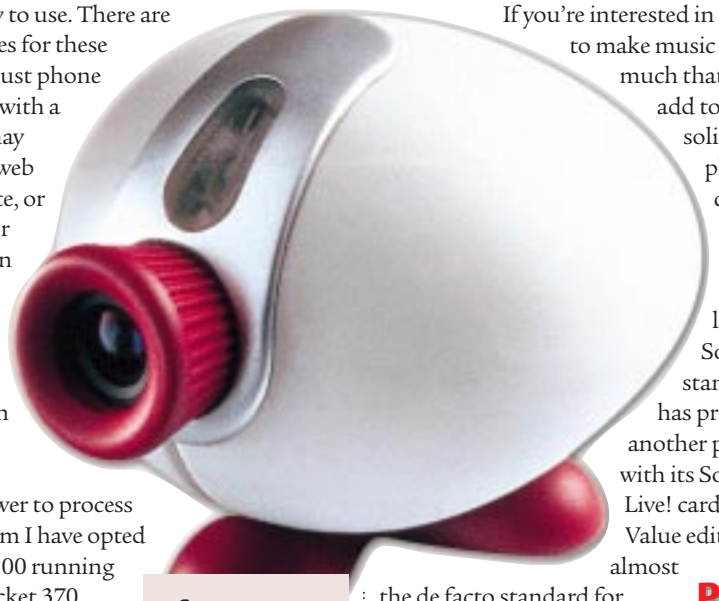
ATI's All in Wonder 128 graphics card packs in a surprisingly good range of features for the price. It may not be the best 3D card in the world, but what it lacks in 3D performance it more than makes up for in accessories. Combining a TV-Tuner, hardware MPEG assistance and TV out, there isn't much else you would need, and for £135 you'd be hard pressed to put together equivalent components for that price.

Prices for DVD-ROMs seem to fluctuate wildly – some come with a hardware MPEG decoder and others are just plain vanilla drives. Since the All in Wonder will be handling the MPEG decoding, we just need a simple DVD-ROM for which Toshiba's six-speed drive provides a good solution at £64. Topping off the bundle with a further 64MB of RAM (two 32MB EDO SIMMs at £30 each) produces a system on which you can watch television and DVD movies all for £259, leaving enough money left over to buy a couple of DVD movies.

Adele's Choice

Video-conferencing has been a buzz word for some years now, with pundits regularly claiming we will all be using video phones soon. However, low-end video conferencing cameras are now cheap and easy to use. There are many more uses for these cameras than just phone conversations with a picture. You may want to add a web cam to your site, or capture stills or video to send in an email. Or, as some people do in the US, you could use them to spy on the nanny.

For the power to process the video stream I have opted for a Celeron 500 running on an Asus Socket 370 motherboard with 128MB of SDRAM. I will also need a fast modem to upload all that data, whether to my website or in an email, so I have also gone for a 3Com WinModem 56K Internal modem which will give me the bandwidth. Finally, the camera itself. As this PC still only runs Windows 95, I stuck to a parallel port camera, rather than getting bogged down in the Windows 95 USB patch. I went for a Philips PCA635VC, which isn't a bad little camera for £55.



▲ SMALL AND LIGHTWEIGHT, THIS VIDEO CAMERA OFFERS LOW COST AND CONVENIENCE

Riyad's Choice

Obviously with £400 you could upgrade this PC to lightning-fast levels, but we'd rather upgrade with a purpose. With this sort of money you can try things with your PC that you might not have thought of before, such as video editing.

For £159 you can get a DC10plus card from Pinnacle. This is an all encompassing entry-level video-editing kit and provides you with everything you need to get going. You'll still need to upgrade the core components though, which means plumping for the old favourite TMC motherboard at £55. You'd have to go for this board since you can't afford to change the memory as well and it has SIMM sockets on it. An AMD K6-III 400MHz will be powerful enough for the job and will only set you back £75.

However, video editing requires a decent amount of hard disk space, so we'll have to buy a new hard drive too. For £102 we can get a 14.4GB IBM DeskStar drive which also sports a nifty 7,200rpm spin rate. Of course the 64MB of EDO memory will hold things back a bit, but the memory can be upgraded at a later date.

Will's Choice

If you're interested in using your PC to make music then there isn't much that you need to add to create a good solid sound platform. Sound cards have come a long way since Creative launched the SoundBlaster standard. Creative has produced another popular option with its SoundBlaster Live! cards, with the Value edition becoming almost the de facto standard for home entertainment systems. In this instance I have opted for the more expensive version, at £102, due to the SPDIF digital input and output and bundled copies of Cubasis and Soundforce.

To complement the SPDIF ports, I decided that a set of Creative's FPS2000 Digital speakers should do the trick. They're not cheap, at £129, but if you intend to do any serious sound work on a PC, there is no point skimping on the speakers.

Once you've created your track, you'll need a medium on which to master it. For £161 you can pick up a top of the range four-speed Hewlett-Packard CD-RW. Producing a competent home studio will set you back £392 in total, leaving enough money to buy a pack of 10 blank CDs at £7.50.

PCW DETAILS

ADELE's CHOICE

Celeron 500
Price *£141 (£120 ex VAT)*
Asustek MEW
Price *£124.55 (£106 ex VAT)*
128MB PC100 SDRAM
Price *£78.72 (£67 ex VAT)*
3Com WinModem 56K Internal
Price *£63.45 (£54 ex VAT)*
Philips PCA635VC Parallel
Price *£64.62 (£55 ex VAT)*

RIYAD'S CHOICE

Pinnacle DC10plus
Price *£186.83 (£159 ex VAT)*
TMC TI5VG+
Price *£64.63 (£55 ex VAT)*
AMD K6-III 400
Price *£88.13 (£75 ex VAT)*
IBM DeskStar 14GXP 14GB
Price *£119.85 (£102 ex VAT)*

WILL'S CHOICE

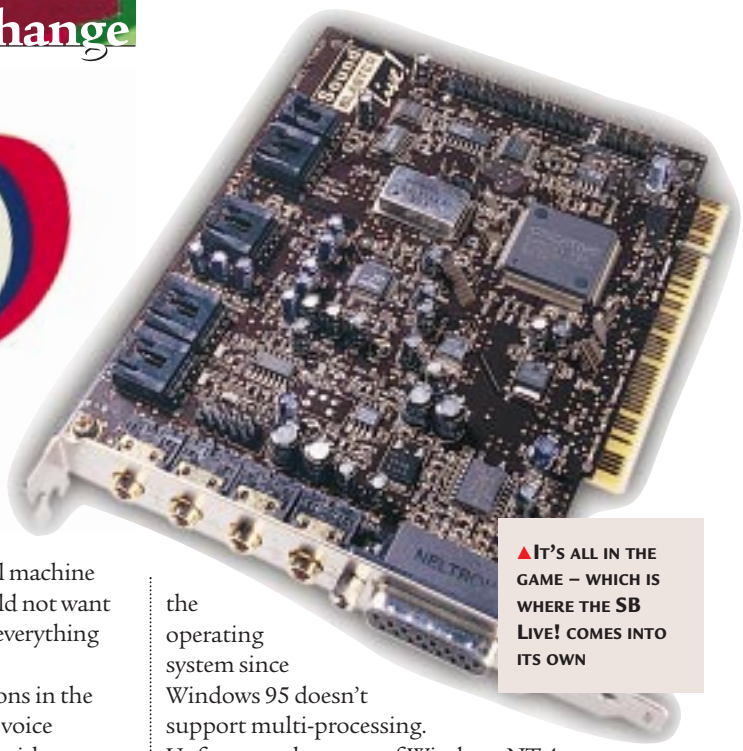
Creative Labs SoundBlaster Live!
Price *£119.85 (£102 ex VAT)*
Creative Labs FPS2000 Digital Speakers
Price *£151.70 (£129 ex VAT)*
Hewlett Packard Surestore 8210i CD-RW
Price *£189.17 (£161 ex VAT)*
Pack of 10 CD-Rs
Price *£8.81 (£7.50 ex VAT)*

Adele's Choice

You can do an awful lot with £500. In fact if you wanted you could probably buy a whole new PC minus the monitor. The spec of our original machine included a good monitor, so we would not want to replace that. However, just about everything else can be updated.

Unless you need SIMD instructions in the Pentium III for applications such as voice recognition, you can easily make do with a Celeron or an AMD K6-III, which are far more moderately priced. So I have opted for a Celeron processor and an Asus Socket 370 motherboard. Obviously I would have to buy new DIMMs and so I have gone the whole hog and bought 128MB.

But there is still money left over in the budget, so I am going for a second, larger hard drive, keeping the original drive on the second EIDE chain as a backup and overflow drive. I am also going to get a new graphics card – nothing flash, just a 16MB ATI Rage Fury and still have the cash for a new sound card, a Creative SoundBlaser Live! Value for a bargain £49. And finally for the last £40 I'll bung in a new 56K modem as well.



▲ IT'S ALL IN THE GAME – WHICH IS WHERE THE SB LIVE! COMES INTO ITS OWN

PCW DETAILS

ADELE's CHOICE

Celeron 500
Price *£141 (£120 ex VAT)*
Asustek MEW
Price *£124.55 (£106 ex VAT)*
128MB PC100 SDRAM
Price *£78.72 (£67 ex VAT)*
Maxtor DiamondMax 4320 – 6.4GB
Price *£74.02 (£63 ex VAT)*
ATI Rage Fury
Price *£61.10 (£56 ex VAT)*
Creative SoundBlaser Live! Value
Price *£57.57 (£49 ex VAT)*
Diamond SupraExpress 56K Pro Internal
Price *£45.82 (£39 ex VAT)*

RIYAD'S CHOICE

Abit BP6
Price *£94 (£80 ex VAT)*
2 Celeron 433 CPUs
Price *£155.10 (£132 ex VAT)*
Windows NT 4 Workstation
Price *£249.10 (£212 ex VAT)*
128MB SDRAM
Price *£78.73 (£67 ex VAT)*

WILL'S CHOICE

Abit BM6 Socket 370 Motherboard
Price *£69.32 (£59 ex VAT)*
466MHz Celeron Processor
Price *£92.82 (£79 ex VAT)*
128MB PC66 SDRAM
Price *£81.07 (£69 ex VAT)*
Microsoft Windows 98 Upgrade
Price *£69.32 (£59.00 ex VAT)*
32MB Matrox Millennium G400 Dual Head
Price *£133.95 (£114 ex VAT)*
Iiyama VM-350 15in monitor
Price *£135.12 (£115 ex VAT)*

Riyad's Choice

Again, £500 will buy you a complete rebuild for your PC if you want one, so I thought I'd try something a bit different. For £80 you can buy a dual Socket 370 motherboard from Abit. Add to this two 433MHz Celeron CPUs at £66 a piece and you have the beginnings of a formidable dual-processor machine that should outperform most fast Pentium III systems when running multi-threaded applications.

You'll also have to change the operating system since Windows 95 doesn't support multi-processing. Unfortunately a copy of Windows NT 4 Workstation will set you back £212, but it does open the door to a multi-processor environment.

Finally you'll need some memory, a 128MB SDRAM module at £67 should be enough. Of course not everyone will benefit from a multi-processor machine, it depends entirely on what sort of applications you're planning to run. However, if you want to run apps like 3D modelling packages a dual-processor machine will be a godsend. Most rendering packages are multi-threaded, so a process can be efficiently split across multiple CPUs. Having a large graphic render split across two CPUs will speed up your work considerably, and as they say, time is money.

Will's Choice

Rather than just going for an all-round upgrade for £500, I decided that it would be better to set up a dual monitor system with a bit more power, able to handle things like word processing on one screen while browsing on the other. The first necessary item is a copy of Windows 98 upgrade, costing £59.

The next thing to consider was the graphics card. I could have bought a standard card and used it in parallel with the existing 8MB Matrox Millennium, however the Matrox Millennium G400 is an excellent 3D card and comes in a dual-head option. The 32MB dual-head version costs £114, which isn't that much more than a good single head 3D card.

Upgrading the processor to a 466MHz Celeron with 128MB of RAM in an Abit BM6 motherboard came to £207, leaving just under £120 to get a monitor. Unfortunately it wasn't possible to get a cheap 17in model for this money, so I went for a good 15in one, in the form of an Iiyama VM-350 at £115. This brings the grand total to £495, leaving enough money to buy a cup of coffee and a packet of Rich Tea biscuits to enjoy while waiting for Windows 98 to install. ❐

You show me yours

GORDON LAING REVEALS THE SECRET TO **PUTTING ON A GOOD SHOW** AND SPREADING YOUR MESSAGE.

YOUR BIG IDEA MUST BE HEARD BY THE world. Perhaps the boss wants to know what's going on, or it's time for the team to catch up on the status of a project. Or you could be pitching for business to potential clients. Whatever the reason, if you have something to say in a business environment, the chances are you will have to make a presentation.

Marker pens and pads still have their place, but the modern media-hardened audience hungers for something more slick. They may desire basic information, but by packaging this the right way, with graphics and multimedia, you will keep their attention and they will remember your message for longer than five minutes.

It goes without saying that technology is there to help you. But is making a presentation

as simple as knocking out your words in PowerPoint? What kind of display should you use? Is your audience going to come to you, or are you going to go to them? Is your equipment portable? Then again, with broadcasting over an intranet or the internet, maybe there's no need for you to meet face to face at all.

To help with these questions, we've considered all aspects of preparing a presentation, including how to deliver it in the most appropriate manner and choosing the right equipment to back you up. We've even thought about technique. By applying our tips to future presentations, you can be confident your message will be understood by the right people in the easiest, most enjoyable and hence most memorable fashion.

Software

Long ago, the presentation graphics software market was very much like word processing or spreadsheets, with many products competing for your money. Today, almost the entire office application market is bundled into suites, with just two key players battling it out – Microsoft with Office and Lotus with SmartSuite. Their presentation graphics packages are, respectively, the ubiquitous PowerPoint and Freelance.

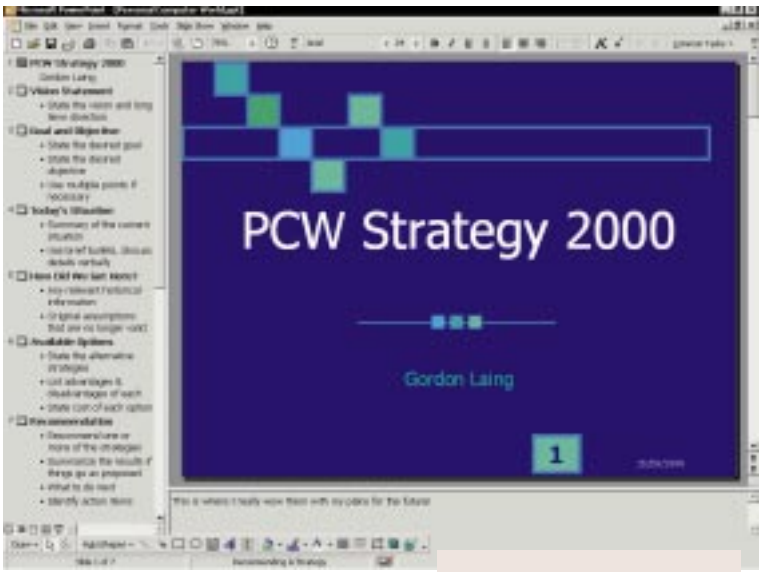
We could launch into a detailed discussion weighing up the pros and cons of each package, but to be perfectly honest, the decision as to which you use is almost entirely down to which one came bundled with your PC or was bought by your company. The battle that Microsoft and Lotus are fighting is not for direct sales to individual customers, but for PC OEMs that will license a suite across an entire range, resulting in a large installed base – think Dell with Microsoft Office and Time with Lotus SmartSuite.

If you already have presentation graphics software as part of either Office or SmartSuite, we cannot recommend switching to the other. It's not just down to PowerPoint versus Freelance anyway. Lotus only sells Freelance as part of SmartSuite, and although Microsoft will sell you PowerPoint separately, you'd be a bit of a fool not to go for the whole Office suite. So, you're looking at word processing, spreadsheet and contact management software too.

One word of warning, however. Microsoft sells several versions of its Office suite and, unforgivably, the Small Business Edition does not come with PowerPoint. Beware, as this is the version usually bundled with PCs. It's particularly frustrating since Office Standard, which comes with PowerPoint, costs the same to new users as Office SBE – about £330, compared with £300 for SmartSuite. PowerPoint 2000 by itself costs £239, but SBE 2000 users, along with anyone who owns an earlier version of Office, can upgrade to Office 2000 Standard Edition for £155, Professional for £199, or Premium for £279. It's a nasty trick not throwing PowerPoint into the SBE, but upgrading an existing copy is still cheaper than switching to SmartSuite.

We can, however, recommend the latest versions of both suites – Office 2000 and SmartSuite Millennium – particularly when you consider the entire package. Freelance and PowerPoint have never been easier to use, but the products still come up with new tricks. Internet is the buzzword for both suites and you can now save your slides as HTML and post them on a website for anyone with a browser to see, or even schedule a presentation to be broadcast across an intranet or the internet. In this instance, your audience point their browsers at a pre-announced website and watch your presentation in real time. As long as there's sufficient bandwidth, you can even supply audio and video to accompany the slides, but this is really only for IT-mad companies with fast intranets.

www.microsoft.com
www.lotus.com

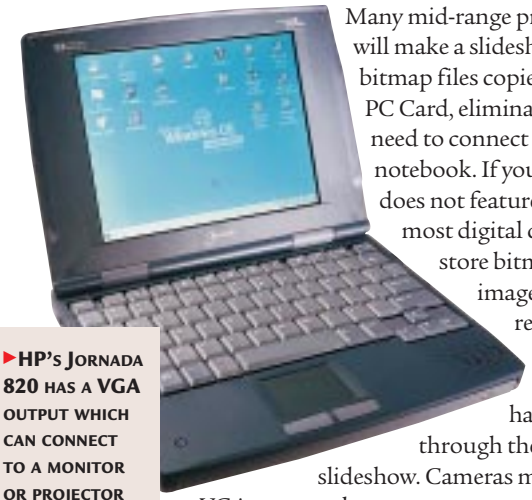


▲ CREATING PRESENTATIONS IS A DODDLE WITH POWERPOINT. IF YOU'RE FEELING UNINSPIRED, IT CAN EVEN WORK OUT A SERIES OF SLIDES BASED ON STRATEGY, BRAINSTORMING OR PRESENTING BAD NEWS

Delivery

What if, horror of horrors, you've prepared a presentation but the PC it's being shown on does not have either PowerPoint or Freelance installed? Fortunately, both packages can export the presentation with a compact standalone viewer and can even bundle the fonts if desired. Then again, you may want to turn your presentation into an Acrobat PDF file, which can cut down on file sizes and boast wide cross-platform compatibility – great for emailing.

Presentation packages also allow you to render each frame into a bitmap file at a specified resolution. While you can view them with almost any software, the point is to allow for more



▶HP's Jornada 820 has a VGA output which can connect to a monitor or projector

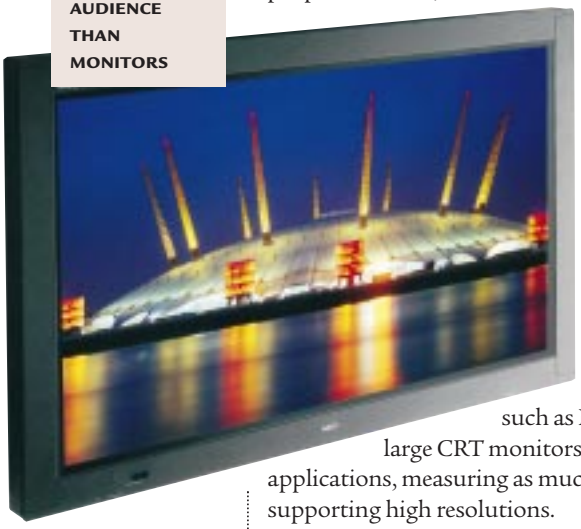
cunning means of delivery. Many mid-range projectors will make a slideshow from bitmap files copied onto a PC Card, eliminating the need to connect a PC or notebook. If your projector does not feature slots, most digital cameras store bitmapped images on removable cards and will happily cycle through them as a slideshow. Cameras may not have VGA outputs, but most pump out composite video which can produce a fair image on a TV set.

Windows CE Professional edition also allows PDAs to open (but not modify) PowerPoint presentations. The displays may be tiny, but most higher-end CE machines, such as HP's Jornada 820, boast VGA outputs, which could be connected to a monitor or even a projector.

Displays

Broadcasting your slides over the internet may offer unique advantages, but the majority of presentations today and in the future will be made in person with the help of some kind of display. There are plenty of options, but you should choose a display based simply on your budget, the number of people in your audience and the kind of room in which they will be.

Personal presentations to fewer than three people can be made with a large notebook screen, eliminating the need for any kind of projector or TV screen. Many desktop replacement notebooks with large 15in displays are designed with that purpose in mind, but watch out for potentially limited viewing angles. If there are fewer than 10 people in the audience, a large computer monitor can do the trick – large text on a 21in monitor can be seen quite easily from a few feet back. Companies such as NEC also produce large CRT monitors for presentation applications, measuring as much as 37in and supporting high resolutions.



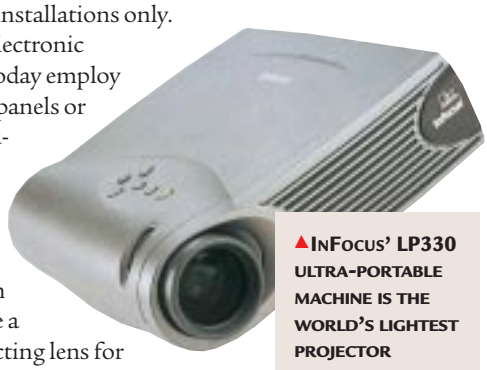
▼Plasma displays reach a larger audience than monitors

Beyond the mid-30in sizes, CRT and LCD monitors become impractical, leaving the market open to other technologies. Plasma display panels are becoming increasingly popular, with their large, bright images, wide viewing angles and slim footprints. You'll find them used for public announcements in stations or airports. Today, they are most commonly available in 42in or 50in diagonals with 16:9 widescreen aspect ratio, for between £5,000 and £13,000. However, like large CRTs, plasma displays are usually too big and heavy for anything other than a permanent installation.

Projectors

For a really big picture, plus the benefits of a relatively small box, you should consider an electronic projector. Almost all offer basic audio capabilities so you don't need to carry speakers around. Most also feature serial ports that connect to the mouse port on your PC or notebook, allowing the projector's remote control to take over the on-screen pointer.

Old-fashioned three-gun CRT projectors may still boast high resolutions and excellent quality, but they're large, difficult to set up and for permanent installations only.



▲InFocus' LP330 ultra-portable machine is the world's lightest projector

Almost all electronic projectors today employ either LCD panels or Texas Instruments' DLP (digital light processing) system, both of which use a single projecting lens for easy focusing, zoom capabilities and quick setup. Many high-end LCD and DLP models are also eating into the traditional CRT permanent installation market.

LCD projectors are most like traditional slide projectors, in that they use a transparent image sandwiched between a bulb and a lens. In all but the cheapest models, you'll find three LCD panels – one each for red, green and blue light. So-called three-chip devices are the ones to go for because single-chip designs are disappointing, particularly in colour performance.

DLP uses a small chip called a digital micromirror device, or DMD, which consists of a matrix of tiny mirrors – one for each pixel. The mirrors can assume positions to either reflect light through the lens or bounce it to an absorption area. By quickly switching the mirrors on and off, a DMD can produce an image for projection. One advantage of DMD is that the gaps between adjacent mirrors are smaller than those between LCD cells, so there's less of a grid effect on a big screen. Single-chip DLP projectors have considerably smaller optical assemblies than

three-chip LCDs and tend to be found in ultra-portable projectors. However, LCD transmission has become more efficient over the years, which, coupled with the comparatively small size of DLP chips, allows LCD projectors to boast higher brightness on average models.

Size

Projectors typically fall into one of three categories: ultra-portable, transportable and fixed. Ultra-portables are small, light and designed to be carried with a notebook. Believe it or not, some are thinner than 3in and weigh less than 3kg. In a bag small enough to fit in an overhead locker, you could carry everything you need to make a full multimedia presentation, including a PC and projector capable of producing a large image.

Mid-range transportables are yesterday's ultra-portables, but weighing around 7kg, they are best kept within the same building and lugged into meeting rooms as and when required. They tend to offer better specifications than ultra-portables, with higher resolutions, brighter images, longer zoom lenses, extra inputs, better audio capability, and PC Card slots which can play back entire presentations without a PC or notebook. Some even allow pointing devices to draw or annotate on the projected image like an electronic whiteboard.

Fixed projectors are designed for permanent installation at venues used regularly for large presentations or shows. Essentially, they're scaled-up transportables, with brighter images and high resolutions capable of projecting huge images across long distances – think 300in images. They may be used to project video more often than the other two categories. However, with size comes lack of portability. These are the type of projector you screw to the ceiling of your venue and leave there.

Location

Image size is a crucial consideration. A zoom lens may be able to slightly enlarge the image for fine adjustments, but the biggest changes are made by moving the projector closer to or further away from the screen. If you have a specific distance and image size in mind, make sure your projector will do it. NEC's transportable MT830G+ can produce an image of between 20in and 300in at a distance of between 1m and 12m. To produce a 100in image, it needs to be between 4m and 5m from the screen. When locating your unit, bear in mind that the bright lamps become hot and need cooling fans. And it's not until you've sat close to a projector that you realise how noisy they can be.

Specifications

If you're in the market for a projector, you should be considering four basic specifications: brightness, resolution, weight and price. Brightness, measured in ANSI Lumens, is probably the most important specification, because it defines how dark the room has to be for a certain size image to be clearly seen. As you enlarge your image it grows dimmer, while rooms with high ambient light levels already pose a challenge. If you're presenting in a room without curtains or you want a big image, you'll need high projector brightness.

Today's ultra-portable and transportable projectors typically feature between 600 and 1,200 ANSI Lumen brightness. In a room with fair ambient light conditions (not direct sunlight but not dark either), a 600 Lumen projector should happily produce a bright 36in image, while a 1,200 Lumen model will produce bright images up to 100in. However, like resolution on scanners and pages per minute on printers, brightness spec is fast becoming a marketing numbers game, with some less scrupulous manufacturers making false claims or suggesting unnecessary power for a given environment. Above 1,500 Lumens is generally bright enough for all but the largest images or brightest environments, but avoid anything below 600 Lumens. Watch out for lamp life, too. At up to £400 each, you should be looking for about 2,000 hours worth of use.

Bright lamps become hot and need cooling fans. And it's not until you've sat close to a projector that you REALISE HOW NOISY they can be

Resolution

In terms of resolution, think of a projector in the same way as you would a monitor. Although scaling tricks can be performed, they have a maximum image resolution, typically VGA (640x480), SVGA (800x600) or XGA (1,024x768). The higher the resolution, the more expensive the device, although you may be surprised to learn that bigger isn't necessarily better. Average PowerPoint slides look fine when projected at SVGA resolution and unless you need to project fine details in diagrams or tiny spreadsheet cells, you shouldn't really need anything higher than 800x600. Remember, the projector is only for presenting a slide, not for creating it.

Like LCD monitors, all LCD and DLP projectors have a native resolution referring to

ALL PRESENT AND ACCOUNTED FOR

When preparing a presentation, remember those you have attended that were useful and enjoyable, as well as any disasters. Learn from them, try not to make the same mistakes and, unless you're presenting to the same group of people, feel free to nick their best tricks.

Know your audience. If they're beginners, don't blind them with science and if they're experts, don't talk down. By understanding their needs you'll make a better presentation.

Where possible, know your venue too. A little reconnaissance beforehand will reveal tricky steps or glaring lights and enable you to check whether you can be seen or heard at the back. Always try the projection system with your computer before the event, or make sure the system at the venue can read your files. More time is lost and more stress generated trying to get projectors to talk to computers than at any other part of a presentation. That's why many people take no risks and bring their own notebook and ultra-portable projector.

When it comes to preparing slides, many presenters end up writing a near-complete script. This may be suitable for stage actors learning a play, but no-one wants to be faced with thousands of words on a screen. Do write notes, but prepare your slides with condensed information in bullet points. The slides are there to announce a new subject or hammer home a brief message. If you're presenting on behalf of a company, it's good practice to use official logos or stick to an agreed set of colours for your slides. If several people are presenting in succession, it may or may not be appropriate to use the same template designs.

Use the slides as a springboard for a detailed verbal discussion, tailored to your audience's preferences. Never read the words off the screen. The screen is only there to back up what you are saying and if you turn around too many times to check it out, your audience will pay more attention to it than to you.

Printed copies are also useful, but it's best to keep them until the end. If you provide a printout before you begin, your audience may skip ahead and spoil any surprises you had planned; they'll also have time to prepare a nasty question about later slides.

The key to all presentations is to be aware of human attention span. Media trainers have long advised presenters to choose no more than three key messages and to stick to them. Any more and your audience will be bored, and you've probably strayed off track. If you only choose one form of backup for your speech, make sure it's a piece of paper with these key messages noted. By sticking to these short messages, you'll ensure the audience goes away remembering what you're about. Finally, if you keep your presentation short and relevant, you'll make friends. Avoid monotone speech, then throw in a joke to lighten things up and they may even ask you back.

the number of horizontal and vertical pixels they have. You can supply signals of higher or lower resolutions, but the device will be forced to scale the image appropriately, with varying results. Some projectors claim they have superior scaling, but our advice is to set your PC or notebook to output a signal at the projector's native resolution.

Advanced projectors can re-scale an image so that the sides slope in or out from each other. This so-called keystone correction allows a correct square image to be projected when the unit is aiming downwards or upwards. Inferior projectors may crop the image to straighten the edges, so choose a model with intelligent keystone scaling.

Weight/price

Weight and price are obvious specifications. If you're going to be carrying a projector around all the time, go for something that weighs no more than 4kg. As far as budget is concerned, projectors are ideal devices to share among a company or department, so several thousand pounds may be affordable after all. Many companies rent projectors, so you can try out a model first.

Price-wise, on the transportable front, NEC's MT830+ (1,250 Lumen, SVGA, LCD, 7.3kg) costs £3,000, while its higher-resolution MT1030+ model (1,100 Lumen, XGA, LCD, 7.3kg) weighs in at £4,000. As far as ultra-portables are concerned, InFocus' tiny LP330 is the world's lightest (650 Lumen, XGA, DLP, 2.2kg) and costs just under £5,500, while its LP400 (700 Lumen, SVGA, DLP, 3.09kg) costs a more palatable £2,285. Pico Direct's PDS700 ultra-portable (700 Lumen, SVGA, LCD, 3.7kg) costs £2,695. Sony's transportable VPLS900E (1,100 Lumen, SVGA, LCD, 5.9kg) costs £3,995, and its lighter VPL-PX1 (1,000 Lumen, XGA, LCD, 4kg) costs £4,750. These figures (ex VAT) give you an idea of how much a particular type of projector will cost, and we can recommend models from any of the companies listed in our contacts box. ❐

PCW CONTACTS

PROJECTOR INFORMATION

Epson
www.epson.co.uk

InFocus
www.infocus.com

NEC UK
www.screengods.co.uk

Pico Direct
www.picodirect.co.uk

Proxima
www.proxima.com

Sony
www.pro.sony-europe.com

Texas Instruments DLP
www.ti.com/dlp

MILLENNIUM lookback

IN THE PAST 25 YEARS THE WORLD OF COMPUTING HAS MOVED FROM PROJECTS BUILT IN ENTHUSIASTS' GARAGES, TO INNOVATIONS WHICH TOUCH OUR EVERYDAY LIVES. ADELE DYER TRAVELS BACK IN TIME.

IT'S A CHICKEN and egg thing. Is computing driven forward by the need for faster machines to run the software we need or does software simply piggyback on the faster hardware, giving us more features and more realtime applications? Or is the drive forward provided by the desire of users to carry out tasks on their computers?

Perhaps the best answer is that the great advances of the last 25 years have been a combination of all three. Where would we have been without the IBM PC, or the GUI operating system, or equally VisiCalc the first spreadsheet and the first killer application, giving business users a reason to buy a computer? On the other hand, you could say that the whole computing revolution came about not because we needed computers, but because a few people were innovative and imaginative, driven by their own interests to create a computer that would sit on every desk and in every home.

The history of computing has as many twists and turns, as many miraculous inventions and as many fortunes won and lost as a Jeffrey Archer novel. The early history of computing was dominated by enthusiastic amateurs who were creative in their thinking because they were following up their own interest and were businesspeople almost by mistake. Take the cost of the MITS Altair 8800, regarded by many as the first personal computer, certainly the first to be commercially available and mass produced, which went on sale in 1975. MITS was eventually overtaken by those with better computers, but it did unwittingly set Bill Gates and Paul Allen, who wrote a version of BASIC to run on the machine, on the road to setting up Microsoft.

Looking back at the early machines, the spirit of experimentation was strong. Many of them – such as the Nascom 1, a British micro featured in the very first issue of *PCW* – had to be soldered together by the buyer and plugged into the TV. There were few universal standards in the early days with machines using a huge array of different processors and components. Every machine at this time was completely different, unlike the mass of near identical clones we see today. But out of small beginnings come great things. The first Apple was built in Steve Jobs' garage, after a meeting between Jobs and Wozniak at the Homebrew Computer Club, where each member built their own computer from their own trial and error designs. Even Intel started out as two people designing processors, producing each design in a matter of weeks. The original x86, the 8086 and the basis on which all current Intel processors are based, only took two men three weeks to perfect.

HOWEVER, THE BIGGEST events in computing were a little better planned. If you consider some of the milestones in computer hardware, they have all fulfilled very specific goals. The Sinclair ZX-80 was intended as a machine that could be bought by everyone, and brought the price down to a spectacularly low £100 for a fully-built computer. Today you cannot even buy a handheld for that price. The BBC micro, by comparison, was built with the sole purpose of educating the general public about computers. It was commissioned by the BBC for a programme it was putting together called *Making the most of the micro* and built by Acorn. This led to the predominance of Acorns in

YEAR	1975	1976	1977	1978	1979	1980	1981	1982
HARDWARE	Altair 8800, IBM 5100	Apple founded, Zilog Z80, Cray 1	Apple II	Intel 8086, Commodore Pet	Atari 400 and 800, Motorola 68000	Sinclair ZX-80, Acorn Atom, first 5.25in hard drives	IBM PC, BBC Micro, Sinclair ZX-81	Compaq portable, ZX Spectrum, Commodore 64, MIDI standard published
SOFTWARE	Microsoft founded	CP/M written for Z80			WordStar, AppleWrite I, VisiCalc, Space Invaders, Ada	Q-DOS sold to Microsoft	MS-DOS, Xerox develops Start system	Lotus 1-2-3

1983	1984	1985	1986	1987	1988	1989	1990
IBM XT, 3.5in DD floppy, Apple Lisa	Apple Mac, IBM PC AT, Amstrad CPC64, First Psion, IDE developed	Sony and Philips introduce CD-ROM, Intel 80386, Token Ring	Amstrad PC1512, Compaq DeskPro 386 SCSI-1 standard finalised	Apple Mac II, Acorn Archimedes, 9.6Kbit/sec modem	NeXT, IBM PS/2, EISA	EIDE, Sun SPARCStation, Intel 486 DX, Creative Labs SoundBlaster	Apple Mac Classic
MS Word 1, DR GEM, WordPerfect 3.0	DNS introduced to Internet (1,000 names), DOS 3.0	Windows launched, Aldus PageMaker	Laplink, Norton Utilities	Ventura 1, QuarkXPress, Windows 2 released	OS/2 1.1, NeXTStep, Ami wp, Tetris	WordPerfect 5.1, Lotus Notes, www invented by Tim Berners-Lee	Windows 3.0

schools. The IBM PC and the Apple II were both meant to appeal to the business sector, providing computing power for what in those days was considered to be a bargain price (around £1,200).

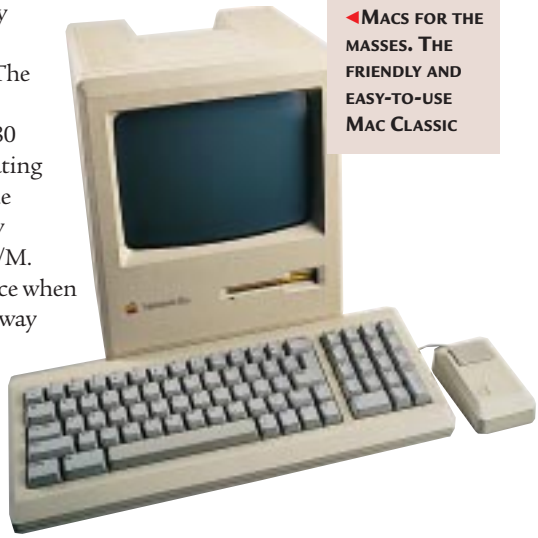
And it was, of course, IBM's PC which did more for the computing industry than any other machine. It was not that it was revolutionary – similar machines had been made by Sharp, Altair, Tandy and Apple – but it was IBM's might behind the product that made it. Many of the standards introduced in that first machine and its subsequent models are still used in machines today, such as a hard disk as standard, spare drive bays for peripherals, 5.25in 1.2MB floppies and later 3.5in 1.44MB floppies, and you could even overclock the PC AT until IBM stamped on the practise with a BIOS that fixed the clock speed. But most of all it was the first open design, based on third-party components.

IBM clones soon followed. The first, from Columbia Data Products arrived just seven months later. However, IBM's lead dwindled a few years later when it decided not to adopt the Intel 386 processor, leaving Compaq to produce the first of these machines in 1986. From this date onwards machines were based primarily around faster processors. The 486 came along in 1989 and the Pentium in 1993. So far, Moore's law, which states that processors double in complexity every year, has not been completely accurate. It is true that they have doubled in speed, but complexity is more debatable.

THIS IS NOT TO SAY THERE were no interesting machines after the arrival of the 386, as the first Psion arrived in 1984, complete with a single-line display, and established the idea of a handheld computer. Notebook computers have, thankfully, got smaller and lighter than the original 20lb luggables. And over the years we have seen a rise of handheld communication devices such as the Nokia 9110. We have also seen RISC machines like Sun's SPARCstations and Steve Jobs' ambitious NeXT cube, now part of Apple.

One advantage of the faster hardware was to make the use of better software possible. Without the 386, Windows would never have got off the ground, as it needed far more power than was available from any other platform. And if you think the processors currently being produced are unnecessarily powerful, just think of what they can do. Continuous voice recognition was delayed only by the proliferation of processors fast enough to run the software, and if we are ever to have voice-only interaction with our PCs, yet more power will be needed.

Before the hardware settled down into predictable, stable formats, the early years of software development saw fortunes made and lost by chance. The classic story is, of course, that surrounding the original PC. In 1980 when IBM was looking for an operating system for its Chess project, Big Blue approached Gary Kildall's company Digital Research, which created CP/M. However, Kildall was out of the office when IBM called and his wife sent them away empty handed, believing the company had bigger fish to fry. Gates pitched to supply an operating system that had not yet been written. In the end he bought the rights to a CP/M knock-off, Q-DOS, from Seattle Computing Products for $100,000 and renamed it MS-DOS.



◀**MACS FOR THE MASSES. THE FRIENDLY AND EASY-TO-USE MAC CLASSIC**

Operating systems have always provoked a certain amount of competition and contention, however. The history of the GUIs in particular is strewn with writs. It is now generally accepted that the idea for the mouse-driven graphical user interface came from Xerox PARC, the Start System was the first WIMP (Windows, Icons, Menus and Pointing Devices). Xerox did not have the foresight to see just what it had, but when Xerox bought 1,000 Apple shares in return for letting the company share its technology, Jobs and Wozniak certainly saw the possibilities. Apple later came up with a GUI for the Apple IIGS and perfected this on the Mac. Xerox sued, but lost its case. Digital Research also produced its own GUI, GEM, which won glowing reviews, but never took off. When Microsoft followed suit

1991	1992	1993	1994	1995	1996	1997	1998
Psion Series 3, SoundBlaster Pro Deluxe (first PC stereo)	CD-I, Digital Alpha, PCI	Intel Pentiums 60, 66 and 75, Motorola PowerPC 601	Acorn PC600, Hayes 28.8Kbit/sec modem, 3Dfx and Videologic 3D graphics cards	Iomega Zip drive, Compaq LS-120, Pentium Pro	Intel Pentium 200	Intel Pentium MMX and Pentium II, AMD K6, first CE handhelds at Comdex	Apple iMac, Intel Deschutes PII 333 and Celeron
Apple System 7, MS Visual Basic, Windows versions of Word, Excel, PageMaker and CorelDraw	Windows 3.1, MS Access	Mosaic, ID Software Doom, MS Encarta	Windows 3.11, Netscape Navigator, Doom II, Descent, Command and Conquer	Windows 95, NT 3.51, JavaScript	MS Internet Explorer, Windows CE	Quake 2, Bladerunner, Grand Theft Auto	Windows 98, continuous speech recognition

▲ **GAME ON: ATARI'S VCS WAS A DEDICATED GAMES SYSTEM**

with Windows, it was Apple's turn to sue for copyright in 1988, but it too lost its case. Microsoft and IBM had also just parted company with a great deal of acrimony, after Microsoft refused to support OS/2, which was originally a joint project between the two companies. By that time, 1990, Microsoft had Windows 3.0 and was well on its way to dominance of the OS market. Since then, however, the release of Linux and BeOS has introduced a little healthy competition.

However, without decent applications to run on our operating systems, computers would still be merely toys for enthusiasts to tinker with. The change came thanks to what are known as killer applications: spreadsheets, word processors, browsers and email packages. VisiCalc was the first of these killer apps in 1979, a spreadsheet that allowed users to do their accounts on a computer. It was written by Dan Bricklin and Bob Frankston, using a computer on a time-share basis. Bricklin developed the functional design and documentation, while studying for an MBA, and Frankston programmed at night when computer time was cheaper. When the product was first sold, it was just 25K long and cost $100.

The first version of VisiCalc was produced for the Apple II and proved a huge advantage for Apple. Versions for other platforms were produced, but it was eventually eclipsed by Lotus 1-2-3.

Another product that proved crucial for the fortunes of Apple was Aldus' PageMaker. Paul Brainerd's company produced the first version in 1985 and ensured that Macs, the first platform on which it was available, would be the machines of choice for every newspaper and magazine, and every repro and graphics house the world over.

1999	2000
Intel Pentium III, AMD Athlon, 2 mega pixel digital cameras	?
Linux Kernel 2.2.0	?

Word processors made their first appearance in 1979 with WordStar and AppleWrite I. We had to wait until 1983 for WordPerfect from SSI, followed swiftly by Microsoft's first version of Word. Other innovative pieces of software quickly appeared after this – 1986 saw the first versions of Laplink, Norton Utilities and Sidekick, the first contacts manager.

So you have your hardware and your software, but effective work in any office cannot be conducted without networks. Ethernet was dreamed up in the Xerox PARC facility in 1973 and office networks came of age in 1985 when IBM launched Token Ring. However, the most interesting breakthroughs were happening in a very low-key manner.

THE INTERNET STARTED OUT as a bomb-proof means of communication for the US military. It then came to be used by academics to exchange information about their research. As far back as 1982 TCP/IP was named as the protocol to support EUnet, Europe's forerunner to the Internet. Tim Berners-Lee, working at the Cern particle-physics lab, came up with the first spec for the world wide web in 1989 and in 1992 Demon started offering internet accounts for £10 a month.

We had to wait until 1993 for the first graphical browser, Mosaic, which added pictures and hyperlinks to the previously text-based web. The project at the University of Illinois was led by Marc Andreessen, who later founded Netscape, which in turn had a virtual monopoly in the browser market until Microsoft's entry in 1996.

Over the last 25 years of this century the rise of the computer has been a major force in shaping the economies and the way of life of most of the world. It has changed the way we do business, the way we communicate, and has affected the operation of everything from factory machinery to washing machines. Some pundits claim that the Internet is bringing about a greater change in the way we live than the Industrial Revolution did in the last century. Only time will tell, but let's hope the next 25 years bring as many exciting and indispensable machines. ❐

Early learning centres?

WITH GOVERNMENT DRIVES TO PUSH EDUCATION INTO THE IT AGE, DEBBIE DAVIES ASKS IF PCS REALLY OFFER THE CLAIMED **EDUCATIONAL BENEFITS** TO CHILDREN.

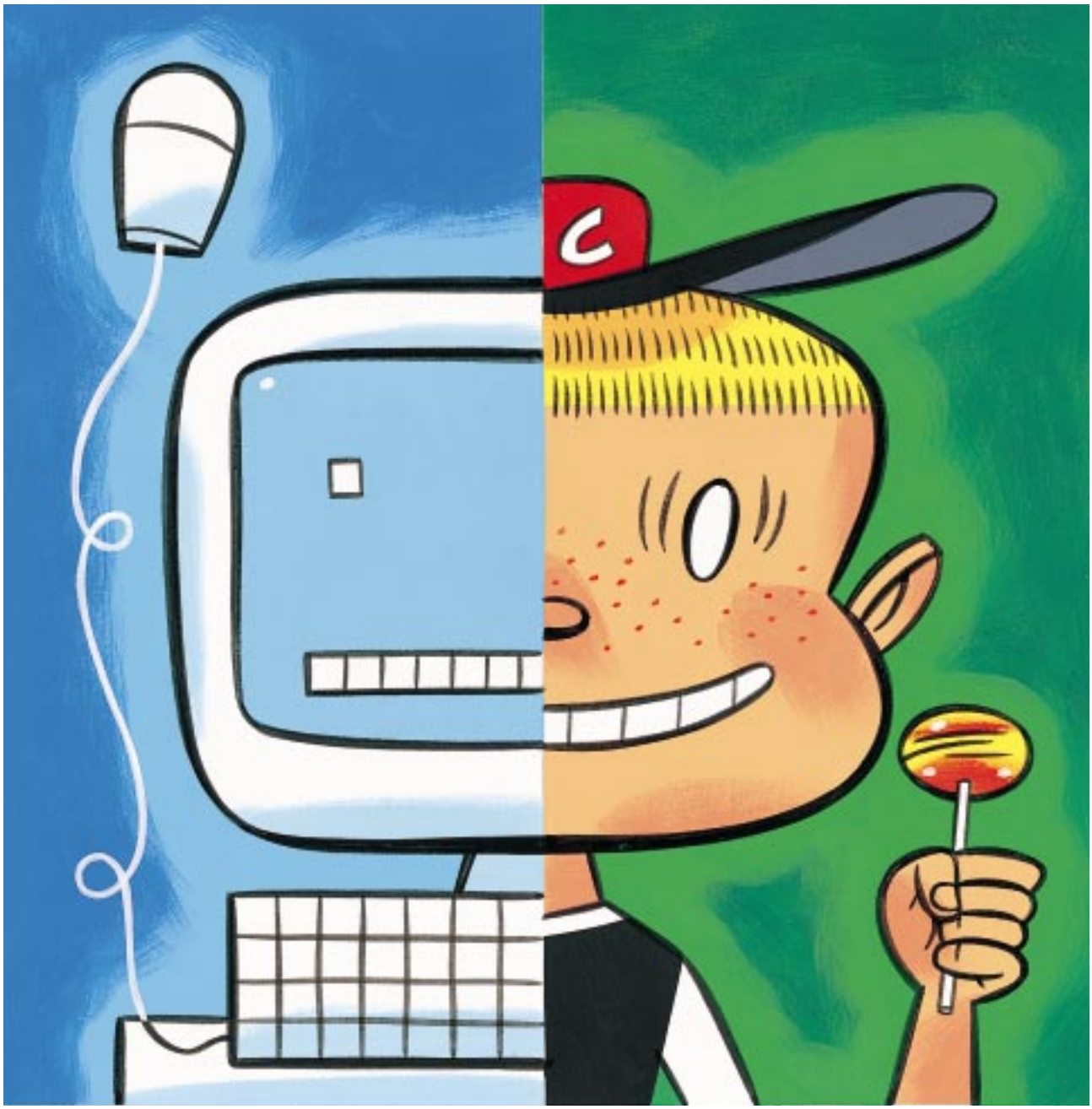


ILLUSTRATION JASON FORD

SHALL I TRY TO OPEN THAT cupboard, climb up those stairs or take everything out of that cardboard box today? Growing up is a great adventure in which children pit their intelligence against the world around them. Nowadays, there is a new puzzle to solve: How do I get that computer to work?

'The idea of setting a young child's enquiring mind against a computer keyboard, strikes me as an endlessly fascinating one,' says Charles Desforges, professor of education at the University of Exeter. Education and Employment Secretary, David Blunkett, agrees. The man who wants to put the wartime exploits of Bletchley Park's Enigma codebreakers back on the history curriculum is keen on computers. At a time when schools are short of funds for books, enormous sums of money are being spent on computers for schools. With academics and politicians in agreement, it comes as a surprise to find so many questions being asked about whether computers are, or are not, of educational value to young children.

Critics of the £1bn investment that will wire primary as well as secondary schools to the internet by the year 2002, say that children have plenty of time later in their academic careers to learn about technology and that early exposure to computers may, in fact, do more harm than good. They argue that technology will change so rapidly between the time a child starts at school in reception class and the time they enter the workplace, that there is no valid vocational reason to start technology training at the ages of four or five. The counter argument is simple. Familiarity with technology is now such a prerequisite that to deny access would put anyone at a disadvantage.

Criticism of computers as a tool for early learning is more perplexing and harder to counter. The argument is that concrete, not virtual, activity is best for young children. Children are better learning whether things are heavy or light, wet or dry, by picking them up and touching them, not by dragging things on a screen. Exposure to the flashiness of computer graphics can stifle creativity, say the cynics, while making the difficult business of learning seem boring.

A growing number of childcare experts question what young children learn from activities such as creating a multimedia presentation – do they end up better informed on the subject and able to think cogently? 'Probably not', says Jane Healy, an educational psychologist and author of *Failure to Connect*, a book published last year that raised questions about the value of computers in education. 'There is absolutely no evidence that technology improves a young child's learning, although it may stimulate their enthusiasm for playing with a new gadget,' says Healy. She argues against children being encouraged to log on before they reach school age. 'Time on the computer might interfere with the development of everything – from the young child's motor skills to their ability to think logically and distinguish between reality and fantasy,' she says.

Finding research to counter these arguments is difficult. 'There is no research that proves computers benefit young children's learning,' says Desforges. The speed at which technology has developed, and the fact that the current generation of adults grew up without computers, means definitive research is still several years away. That leaves today's parents in a quandary. Having bought a computer on the manufacturer's promise of the learning advantage it offers your children, how do you make it work?

'There is no point in setting the computer to one side and filling the screen with software that is boring and pointless,' says Desforges. Yet this is what early-learning software often does.

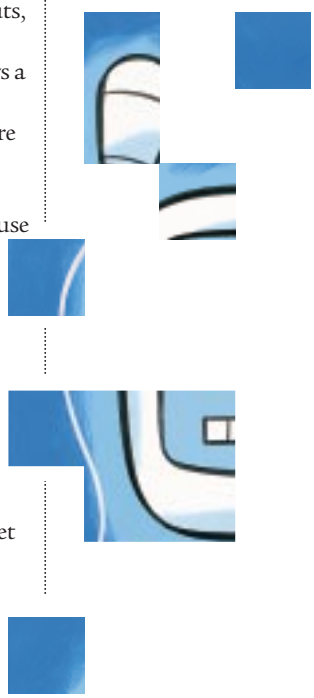
'Teachers like programs which fill the whole screen so there is little chance of a child crashing the computer or getting lost between programs,' says Mike Matson, a former teacher and author of educational material for websites and CD-ROMs.

TYPICALLY, SOFTWARE DESIGNED for the under sevens sets out to teach literacy and numeracy skills. In particular, programs for two to five-year-olds, such as Microsoft's My Personal Tutor and Knowledge Adventures' Jump Ahead and Adi Boo series, focus on language skills, visual and auditory discrimination, counting and sequencing, memory recall and attention-building skills.

There is no exploration of keyboard shortcuts, playing with windows, maximising and minimising programs. Instead, the child follows a predetermined path chosen by the software's author. Big claims about learning advantages are made for children who follow the path.

The interface by which the child uses the program is reduced to the simplest form of mouse control. The keyboard can usually be set to one side. Learning is through interactive games presenting concepts such as sequencing or shape recognition. However, transferring games that have proven value and appeal from the real world onto the computer screen does not always work.

'A young child can exercise far more skill with a shape-sorting toy than by doing the equivalent activity on-screen,' says Desforges. Yet on-screen shape-sorting games proliferate. Blowing virtual bubbles is a popular demonstration of comparative size on screen. The mouse is used to control the size that the bubbles become. Bubble blowing is a



classic child's game and enormous fun. Transfer it to the computer and not only does it lose some of its educational value, it becomes boring too. The play dimension is diminished. Anyone who has watched children playing will know that games are kept alive by the child's own invention. A child may blow space bubbles, then make dinner for teddy out of bubbles, or go behind the sofa to blow secret bubbles. Early-learning software reduces these options for invention.

CHILD DEVELOPMENT experts unanimously agree that the way for early learners to acquire skills such as language is through human interaction. 'Research on early brain development shows that toddlers have a critical need for direct interactions with parents and other significant care givers for healthy brain growth and the development of appropriate social, emotional, and cognitive skills,' says a statement from the American Academy of Pediatrics.

Desforges agrees. 'You can't beat the language exchange of human interaction for the development of language skills,' he says. The same applies to acquiring skills such as visual discrimination or counting, grouping and sequencing. 'You don't need to switch the computer on to teach a young child about colours or shape,' says Matson. 'Returning from the supermarket with a car load of things and then sorting them into heavy things, green packets and square shapes is better than spending £20 on a piece of software.' The danger is that parents and carers will use software as a substitute. 'After five minutes, the child may have left the computer, the adult is then peeved and so insists the child uses the computer,' says Matson. This is a no-win scenario.

Children without computers are INFORMATION AND COMMUNICATION-STARVED as well as intellectually disadvantaged

If the thrust of most early-learning software is wrong, what do our child development experts recommend the under-sevens do with computers? Is their advice to leave computers off the menu all together?

This brings us back to Desforges' first observation – that children of this age are inquisitive and that the match between the enquiring child and a computer is one that is made in heaven. 'If computers present a social danger, it is to those families without access to one. Children without computers are information and communication-starved as well as intellectually disadvantaged,' he says. His objective would be for children to master the control of computers as early as possible. Email is another facility children should use as early as possible. 'Email can have a big impact on a child's writing,' says Desforges. It is a brief writing form and children's literacy skills will benefit if they email friends or join a club.

Matson agrees: 'In the future, all writing will be done using a computer.' Functions such as Copy and Paste can be used to repeat a line such as 'I like chips' lots of times, then the end word can be deleted and changed to make a poem. Or a favourite passage of prose can be loaded and then everything erased except the child's favourite words. This will instantly create another poem and the child will gain confidence.

Discovering Undo and Redo functions is another favourite with young children, as is changing font sizes to impossibly big and small options. A word processor specially designed for children, such as Talking Textease from Softease, may be worth considering. This adds word banks so typing is less of a chore and audio support so children can hear what they have written. 'Spoken text helps reluctant readers and avoids you growing up mispronouncing a word,' says Matson.

Fortunately, schools should be developing these sorts of exercises in order to fulfil the National Curriculum requirements for Information Communication Technology (ICT) at Key Stage 1. Requirements for ICT include the expectation that children will have sent and received email and that some will have mastered attachments by age seven. Children should also be using Copy and Paste and Find and Replace functions in word processing.

With almost two-thirds of primary schools connected to the internet, having the necessary tools to teach ICT is less of a problem. In Desforges view, the teacher's own experience is more likely to hold pupils back. 'We will need to wait for the next generation before all teachers exert power over the computer,' says Desforges.

Creativity is the other area in which child development experts advocate computers. 'Programs that let children move pre-arranged shapes around allow lots of expression,' says Matson. Desforges agrees: 'The designer of The Beatles' *Sergeant Pepper* album sleeve spent three months making a collage of London scenes. With a computer, he could have done it in an afternoon.'

Enriching quality of life is what computers should be about, says Desforges, not asking children to select blue buttons from green. 'Computers make it easier and faster to do things such as shopping, or finding the route to somewhere you want to visit,' he says. These are the best reasons for children to acquire computer skills, without which they risk being disenfranchised. ❐

MESH

Office in a box

As companies come to rely increasingly on computers, office machines need to be up to the job. We set out to find the ultimate small business PC.

Ratings

★★★★★ **Highly recommended**
★★★★ **Great buy**
★★★ **Good buy**
★★ **Shop around**
★ **Not recommended**

Last month we invited the manufacturers to provide their ultimate home system. This month we wanted to see what their ultimate small business PCs looked like. We asked 14 top vendors to supply us with a machine that would be capable of performing all the standard office functions such as word processing, numerical analysis, sending and receiving email and creating presentations. We left the choice of processor open, but specified a minimum of 128MB of RAM and a 17in monitor.

We asked for a modem and a network card to be included, as we thought it would be useful for a small business to have both options, because many will have their own LAN but not all will have Internet access via it. In this situation, the use of a modem becomes necessary and, depending on the number of users in the business, may even be more economical. Most of the machines submitted were around the £1,000 mark, so to find out what the best small-business PC is read on...

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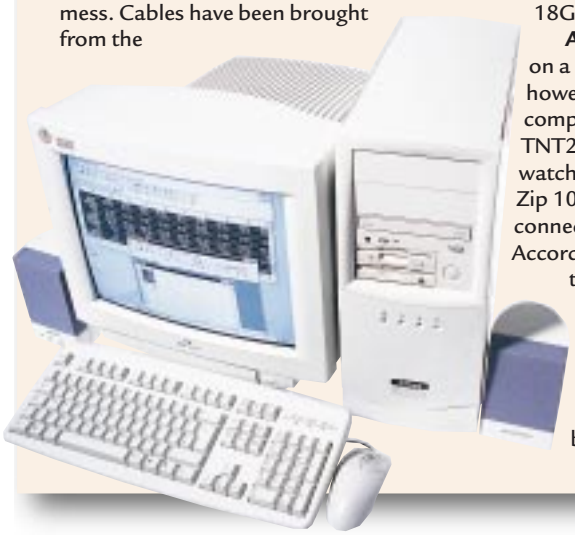
• ***PCs tested by*** *Jason Jenkins and David Eade.*
Reviewed by *Jason Jenkins*

Atlas **Meridian 450**

In contrast to the majority of vendors, Atlas has chosen an AMD solution. The Meridian 450 is built around the lowest clocked processor on test, a K6-III 450, a fact that helps to explain its lower position on the SYSmark table. This does not mean that it would be a slow machine in an office environment, but it does offer less value for money than others here.

The inside looks a bit of a mess. Cables have been brought from the power unit to the motherboard in front of the processor, just above the AGP card, rather than around the sides of the case. A ribbon cable stretches from its socket on the motherboard across the memory slots. As with the Hi-Grade machine, an opening for another fan is present at the rear of the case but no fan is present. The extra fan is located at the base of the case below the impressively large 18GB WD hard drive.



Atlas has splashed out on a Hitachi DVD drive, however, and the motion compensation on the Atrend TNT2 graphics card will let you watch DVDs at your leisure. A Zip 100 is also present. External connectivity is provided by an Accord 56K modem that, like all the modems in this test, supports the latest V.90 standard.

The popular Creative SoundBlaster 128 makes an appearance, and the basic speakers will provide decent enough sound. The 17in ADI MicroScan E55 monitor is a solid choice with BNC as well as D-SUB connectors on the rear. Lotus SmartSuite Millennium is included and a three-year on-site warranty adds significant value.

PCW DETAILS

Price *£1,263.13 (£1,075 ex VAT)*
Contact *Atlas 0181 532 6515*
www.atlasplc.com
Good points *Three-year warranty, Zip 100 drive*
Bad points *Slower processor, messy build quality*
Conclusion *A fair system but there are better deals available here*

Build Quality	★★
Performance	★★★
Value for Money	★★★
Overall Rating	★★★

Big Red **Mercury 450**

Big Red has supplied us with a half-decent machine, but it's not really appropriate for this group test. One reason for this is the unnecessarily gimmicky Logitech radio keyboard and mouse. A Pentium III 450MHz chip is supported by a single 128MB DIMM – leaving an impressive three DIMM slots free.

There are no on-board peripherals, with the Diamond modem, Realtek network card and Creative Audio PCI 128 in the PCI slots, leaving two PCI and one shared slot free for future expansion. Internal presentation is good, with cables grouped and tied very tidily at a sensible length with only one rogue wire slightly too long for the processor fan. An extra fan is mounted directly under the hard disk to draw heat away from it. One annoying feature of the case is the front door that does not fold back flush with the PC but pokes out annoyingly.

Big Red has opted for an LS-120 drive to provide backup. This drive has the advantage of supporting media 120MB superdisks while still reading existing floppies. A good network backup would also be necessary, with a massive 25GB IBM hard disk taking care of data storage.

The 17in Viewsonic E771 monitor is far from the best in this test. It initially looked awful as Big Red had not set it up correctly, and after we downloaded the correct driver it did not improve greatly. Once set up the display was disappointing with a harsh image and certainly couldn't do justice to the nVidia Riva TNT2-based graphics card coupled with it. The office productivity suite is Lotus SmartSuite Millennium, which can handle the majority of tasks.

PCW DETAILS

Price *£1,173.82 (£999 ex VAT)*
Contact *Big Red 08700 711 117*
www.bigred.co.uk
Good points *LS-120 drive included*
Bad points *Cordless keyboard and mouse, monitor*
Conclusion *Big Red needs to go back to the drawing board and think more small business and less home system*

Build Quality	★★★★
Performance	★★★
Value for Money	★★★
Overall Rating	★★★

Carrera **Octan M550**

Carrera has opted for the fastest processor on test. The Athlon 550MHz really packs a punch and explains why this PC has come top of our SYSmark league table. However, in an ultimate small business PC group test, speed isn't everything, and the money spent on this fast processor could have been better used on extras such as a Zip drive or CD-RW. That said, build quality is excellent, with the processor amply cooled by two processor fans and the system fan. Cables are lovingly tied out of the way of the motherboard slots and expansion bays, making upgrading simple. Carrera has even made sure that the CD audio cable goes round the edge of the case rather than straight across the middle.

Carrera is one of the few manufacturers not to put a card in the shared slot. The 128MB of memory is contained in one DIMM, leaving two slots free for expansion. There's no removable storage, which is a little disappointing, but there's always a possibility that one of the other machines on the network has this covered. The lack of extra drives means that there are more bays free than in other systems: four 5.25in and one 3.5in should see you through several upgrades.

The Hansol monitor is a fairly standard shadow mask model that would serve most small businesses adequately. A Vortex soundcard, Realtek network card, E-Tech modem and Lotus SmartSuite Millennium will provide all the office functionality you could need, while the 14GB hard disk should keep most offices happy. Carrera has rounded the package off with a two-year on-site warranty.

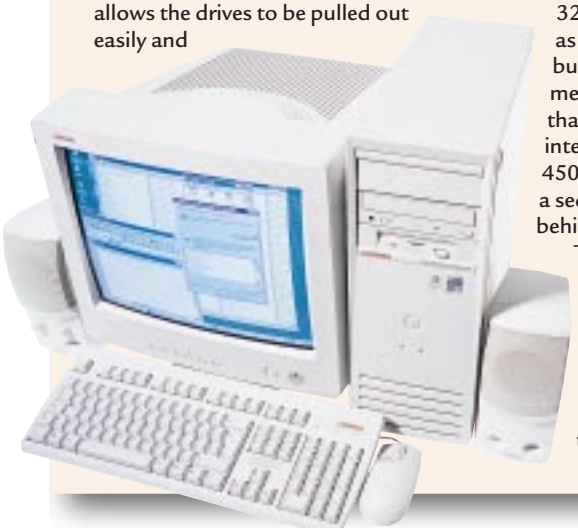
PCW DETAILS

Price *£1,173.82 (£999 ex VAT)*
Contact *Carrera 0181 307 2800*
www.carrera.co.uk
Good points *Fast processor, good build quality, two-year on-site warranty*
Bad points *No removable storage*
Conclusion *A solid and very fast machine, although there are more rounded systems on test*

Build Quality	★★★★★
Performance	★★★★★
Value for Money	★★★★
Overall Rating	★★★★

Compaq **Prosignia 330**

Compaq is the world's largest PC manufacturer and has built its reputation on producing high quality office machines. Considering this, the Prosignia is disappointing, although it does have some useful features. The case is unique and very ingenious, it can be either a desktop or a tower. A large green clip on the inside of the case secures the CD-ROM, floppy disk and hard disk. When lifted it allows the drives to be pulled out easily and repositioned so that you can turn the case and still access the drives. This is a good idea, but there was a problem with our machine in that it was not as stable as the other cases when in the tower position, wobbling slightly.



Build quality was not all we expected from Compaq. Surprisingly there are no DIMM slots free with the 128MB of RAM made up from one 64MB and two 32MB DIMMs. Cables are not as tidy as in other units, with a bundle tied in front of the memory slots and ribbon cables that are too long for their intended use. The Pentium III 450's heat sink is enormous with a secondary fan placed directly behind it to assist with cooling. This slower processor helps explain its lower SYSmark result.

The 9.1GB IBM Deskstar hard drive is the smallest here. Meanwhile, a SoundBlaster Audio PCI 64V takes up a PCI slot, with a Compaq modem and network card rounding off the configuration. The Compaq S700 shadow-mask monitor produces a decent image and has a good OSD, although it's not an outstanding example. Overall, the Prosignia doesn't offer the best value for money, indicating that Compaq is better suited to high-volume corporate clients.

PCW DETAILS

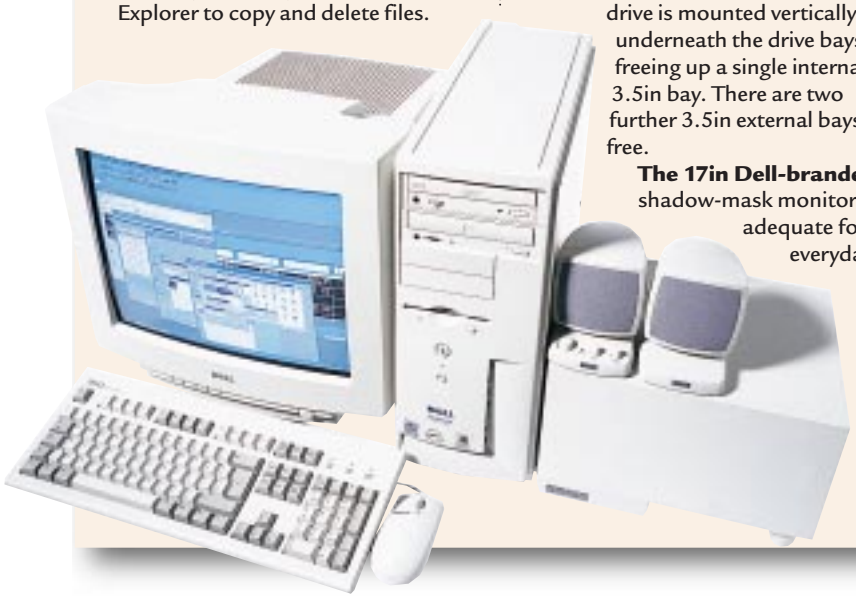
Price *£1,090.40 (£925 ex VAT)*
Contact *Compaq*
www.compaq.co.uk
Good points *The case can be a desktop or a tower*
Bad points *Unexciting specification*
Conclusion *Adequate as far as it goes, but we were looking for more*

Build Quality	★★
Performance	★★★
Value for Money	★★★
Overall Rating	★★★

Dell **Dimension T500**

Dell's core market has always been PCs for business, and its years of experience have paid off here. This machine is very well stacked for the price. The main difference is the inclusion not only of a Toshiba DVD drive but a Sony CD-RW as well. The CD-RW software detects the presence of a recordable disc correctly and lets you use Windows Explorer to copy and delete files.

Build quality is generally good, with cables tied neatly out of the way. The case employs Dell's processor cooling system where an extra fan is placed just below the system fan and a plastic funnel is used to guide the air over the CPU. The 128MB of memory is contained in a single DIMM, leaving two other slots free. The 13.6GB IBM hard drive is mounted vertically underneath the drive bays, freeing up a single internal 3.5in bay. There are two further 3.5in external bays free.



The 17in Dell-branded shadow-mask monitor is adequate for everyday office needs but it doesn't excel. Display is even and reasonably clear, but the surface is fairly reflective. The US Robotics modem will connect you to the Internet if your LAN, supported by the 3Com Etherlink 10/100 card, does not have Internet connectivity. On the whole, Dell has put together an excellent package.

PCW DETAILS

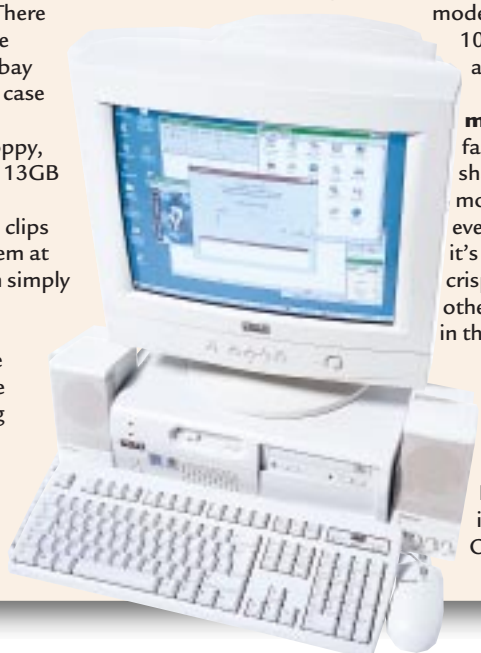
Price *£1,173.82 (£999 ex VAT)*
Contact *Dell 0870 152 4850*
www.dell.co.uk
Good points *DVD and CD-RW are both included*
Bad points *Monitor could be better*
Conclusion *A well stacked system that is excellent value*

Build Quality	★★★★★
Performance	★★★★
Value for Money	★★★★★
Overall Rating	★★★★★

Elonex **ProSentia**

Elonex has presented us with one of the few desktop cases, a design that is definitely suited to the task of a small-business machine. One drawback of the desktop case is that it restricts the number of slots that are available for upgrading – only one shared slot is free for future cards. There is also only one 3.5in internal bay free. Once the case is off, you can remove the floppy, CD-ROM and 13GB hard drive by squeezing two clips that secure them at the front, then simply pull them out.

Elonex has maximised the number of free slots by opting for onboard sound in the form of a Creative SoundBlaster Audio PCI 64V chip. This is more than adequate for an office machine, and we found it surprising that more manufacturers had not opted for onboard sound in this instance. The remaining slots are occupied by solid, reliable components: a US Robotics V.90 modem and an Intel 10/100 network adaptor.



The 17in monitor is a fairly standard shadow-mask model with an even display, but it's not quite as crisp and sharp as other 17in models in this test.

The real bonus of this system is the bundled software – the Holy Grail that is Microsoft's Office 2000. However, it appears that its inclusion has been at the expense of features we have seen in other systems. Other manufacturers have included items such as Zip drives, DVD drives and CD-RWs, that Elonex has chosen to ignore. That said, many small businesses would be happy with a spec which includes Microsoft Office.

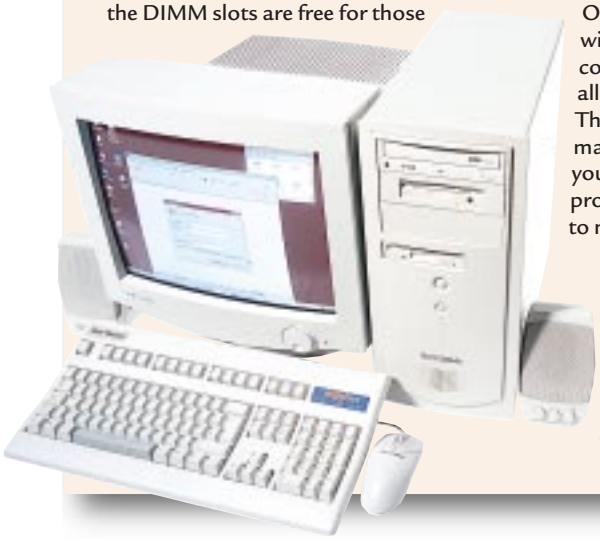
PCW DETAILS

Price *£1,173.82 (£999 ex VAT)*
Contact *Elonex 0171 452 4444*
www.elonex.co.uk
Good points *Microsoft Office 2000 included, desktop case*
Bad points *Not as fully featured as other machines here*
Conclusion *A decent machine as far as it goes*

Build Quality	★★★★★
Performance	★★★★
Value for Money	★★★
Overall Rating	★★★★

Evesham Vale **Athlon TNT2**

Evesham has presented us with a system that would honour the desk of any small business. Build quality is up to the company's usual high standards, with the cables completely wrapped with plastic ties to keep them out of the way and looking tidy. The familiar Athlon-compatible MSI motherboard allows plenty of room for future expansion, with two ISA slots and two PCI slots free. Two of the DIMM slots are free for those hungry for more memory. The TNT2 card may seem a bit excessive for an office machine, but combined with the Athlon it certainly helps to keep the performance up. The Athlon 500MHz processor has 128MB of RAM to support it along with an impressive 20GB Maxtor hard disk.



The 17in Mag monitor is adequate, although the display looked slightly blurred to us. The OSD, however, is excellent, with the easy-to-use dial control giving quick access to all of the image adjustments. There is no DVD-ROM in this machine – not something that you might think of as a problem, but if software starts to move to a DVD format, as is promised by several software firms, you'll be forced to upgrade.

The Iomega Zip 100 is a useful and popular choice, its large user base makes it ideal for file transfer. The Key Tronic Ergoforce keyboard is a true joy to type on. A Diamond SupraExpress 56K modem and an Intel Pro 10/100 card will provide you with solid connectivity. The office suite included with the package is Lotus SmartSuite Millennium, which is more than up to the job.

PCW DETAILS

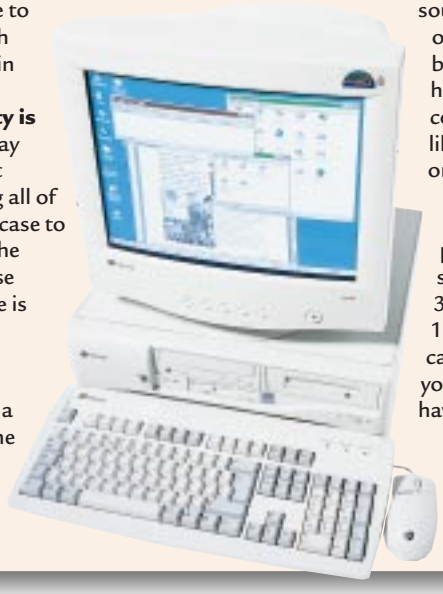
Price *£1,232.58 (£1,049 ex VAT)*
Contact *Evesham 0800 038 0800*
www.evesham.com
Good points *Lovingly built, good specification*
Bad points *Monitor could be better*
Conclusion *An impressive small business machine – a better monitor could have won Evesham an award*

Build Quality	★★★★★
Performance	★★★★★
Value for Money	★★★★
Overall Rating	★★★★

Gateway **GP7-500**

Gateway was one of two manufacturers to supply us with a space-saving desktop case, the only size that will fit onto many people's desks. The most striking feature was the monitor: the 17in aperture grille tube displays a bright and crisp picture. Unfortunately the monitor has an annoying OSD, as it's only possible to navigate through the long menus in one direction.

Build quality is fair, with Gateway making a valiant attempt at using all of the space in the case to its best effect. The design of the case means that there is only one 3.5in external bay, forcing the company to use a 5.25in bay for the Zip 100 drive. A plastic funnel channels air from the system fan to the processor, which has a very large heat sink to assist cooling. One problem is the position of the Gateway Telepath PCI modem. It has been positioned in the single shared slot, ignoring the three free dedicated PCI slots. It may not seem vital to have a soundcard in an office machine, but considering how little one costs we would liked to have seen one.



The Quantum hard drive provides 13GB of storage and the 3Com Etherlink 10/100 network card is there for your network if you have one.

The bundled Microsoft Worksuite 99 includes Works 4.5 and Word 97, which is unfortunately only patched to SR-1 level. A 16MB version of the Rage Fury provides graphics together with solid Direct 3D and OpenGL support. All in all a fair machine but one that is simply not as well stacked as others in this group test.

PCW DETAILS

Price *£1,160.90 (£988 ex VAT)*
Contact *Gateway 0800 55 2000*
www.gateway.co.uk
Good points *Decent monitor and desktop case*
Bad points *Lack of soundcard a cheap omission*
Conclusion *A good machine suited to the task but other manufacturers are giving you more for your money*

Build Quality	★★★★
Performance	★★★★
Value for Money	★★★
Overall Rating	★★★

Hi-Grade **Ultis PVIII**

Hi-Grade has made a fair attempt to provide us with an ultimate small business machine, but the Ultis falls just wide of the mark. A 500MHz Pentium III, a Zip 100 and 128MB of RAM is a good start, but quality problems pull the machine down. Hi-Grade has opted for a large 19in Sampo shadow mask monitor. Unfortunately this was not set up properly on arrival and would not refresh higher than 60Hz. After loading the correct drivers, we were not overly impressed with the display. Although it wasn't terrible, it couldn't show the 32MB TNT2 graphics card off to its full potential.

Inside the case, build quality was average. The proximity of the system fan to the processor forced one bunch of cables to be brought directly in front of the CPU. Another bunch was tied in front of the memory slots. The case has an opening for a fan at the rear, but no fan in front of it, creating an opening for dust. However, an extra fan has been placed at the base of the unit to circulate the air. The case allows for a fair bit of expansion – two external 5.25in bays are free and an internal 3.5in bay is available if you manage to fill up the 14GB IBM hard disk. Most of the other components are fairly standard – a CD-ROM (no DVD or CD-RW as in some of the other machines), an SMC 10/100 network card, an Accord 56K modem and a SoundBlaster Audio PCI 128 soundcard. Lotus SmartSuite Millennium rounds off the package to get the system working from day one.

PCW DETAILS

Price *£1,263.13 (£1,075 ex VAT)*
Contact *Hi-Grade 0181 532 6100*
www.higrade.com
Good points *Some good component choices*
Bad points *Inside could be tidier, monitor doesn't really cut the mustard*
Conclusion *Not a bad effort but it doesn't stand out in this company*

Build Quality	★★★
Performance	★★★★
Value for Money	★★★
Overall Rating	★★★

Dedication's what you need

As you probably already know, a small Windows network provides a great way for you to share files between PCs. What you may not have thought of is using the network to provide printer sharing as well. This allows people to print to a remote printer just as if it was connected directly to their machine, and removes the hassle of having to copy files onto a single machine with a printer connected. It also means that you only need to install a single printer in the office, ultimately saving money.

There are two methods that can be employed to achieve printer sharing. The first and most obvious solution is to use the standard File and Print sharing under a Windows network, which allows other people to get quick access to a printer connected to a single machine. This solution isn't without its major drawbacks, however, as the ability to print lies solely in the hands of the person operating the PC connected to the printer. Should they choose to reboot, or should their machine crash, no-one else in the office will be able to print anything. Needless to say, only when this PC is powered up can people gain access to its printer. Life's not a bed of roses for the poor owner of the designated printer machine either. Should you send a large print job through to the printer, then it's going to be this PC that has to sit there dealing with it, which can mean severe performance degradation. This kind of performance loss is even more likely to make the user reboot his machine, destroying your print job.

By far the best approach in a situation like this is either to get yourself a printer which can take a network card, or get a dedicated print server for as little as £50. The extra outlay will be well worth your while, and the benefits are immediately visible. No longer are your print jobs held to the mercy of a PC's reliability, and as long as the printer has power then all the users on the network can print to their heart's content. Not only this, but you can put the printer wherever you want in the office, rather than being tied to one person's desk.

▲NETWORKING YOUR PRINTER CAN SERIOUSLY ENHANCE YOUR PRODUCTIVITY

If you're serious about your IT productivity in a small business environment, a network printer solution really is a necessity.

DAVID LUDLOW

Mesh **Professional 500B**

Mesh has clearly thought long and hard about the intended use of this machine and the effort has paid off. What really stands out is the Taxan Ergovision 755 TCO99 monitor. This aperture grille display is excellent: crisp, bright and vivid. A powered USB hub sits in the base, with four downstream ports and one upstream port, enabling you to daisy chain USB devices. It even manages a refresh rate of 75Hz at its maximum resolution of 1,600 x 1,200. The only downside is the captive video cable.

The Pentium III 500MHz is the most popular processor in this test, and its high SYSmark score shows that it can cope with any office applications. The Asus motherboard is unusual in that it features three ISA slots. Connectivity comes in the form of a Diamond SupraExpress V.90 modem and an Intel Pro 100 NIC. The 13GB Western Digital hard drive should provide ample room for office documents and applications for some time to come.

Graphics acceleration is provided by a Matrox Millennium G400 dual head, perhaps slightly over the top in a small business PC, but combined with the Taxan monitor it produces a lovely image. The dual monitor support could also be useful in the office. For small backup jobs and a quick way to transport larger files, a Zip 100 is included. Sound is handled by a Creative Audio PCI 128 and a pair of Teac speakers, while a two-year on-site warranty rounds off the bundle and helps win Mesh the Editor's Choice.

PCW DETAILS

Price *£1,173.82 (£999 ex VAT)*
Contact *Mesh 0208 208 4706*
www.meshplc.co.uk
Good points *Excellent monitor and build quality, two-year on-site warranty*
Bad points *None to speak of*
Conclusion *An excellent machine that lives up to its claim to be an ultimate small business PC*

Build Quality	★★★★★
Performance	★★★★
Value for Money	★★★★★
Overall Rating	★★★★★

Panrix **Avenia**

Panrix has built its small business machine around the swift Athlon 500 processor and the 16MB Matrox Millennium G400, which helps to explain the machine's high benchmark scores. Build quality is good: cables have been tied and positioned well out of the way of the processor, memory slots and expansion bays. The Slot A-equipped MSI motherboard leaves little to chance, with more ISA slots than most. Nothing is onboard, but even after the Creative SoundBlaster Audio PCI 128, Diamond SupraExpress modem and Intel Pro 100 network card have been accounted for, there is still one PCI, one ISA and one shared slot free.

The Zip 100 and floppy drives occupy the two 3.5in bays, leaving only one 5.25in bay for expansion. This has forced Panrix to mount the 13.6GB IBM hard drive vertically against the side of the case. Panrix has also opted for a DVD-ROM drive in place of a CD-ROM, adding some future-proofing. The Matrox's motion compensation and Athlon 500 mean that you can watch DVDs with no dropped frames if you choose. You also have the ability to load any DVD software that will be released. The 17in Hitachi CM650ET monitor is adequate. The shadow mask tube displays a sharp image with vivid colours, although it is fairly reflective as you might expect. The Panrix-branded keyboard is fairly standard and comfortable to type with, the only unusual feature being the curve in the base to fit in with the larger space bar. Lotus SmartSuite Millennium comes bundled allowing you to perform most of the standard office functions with ease.

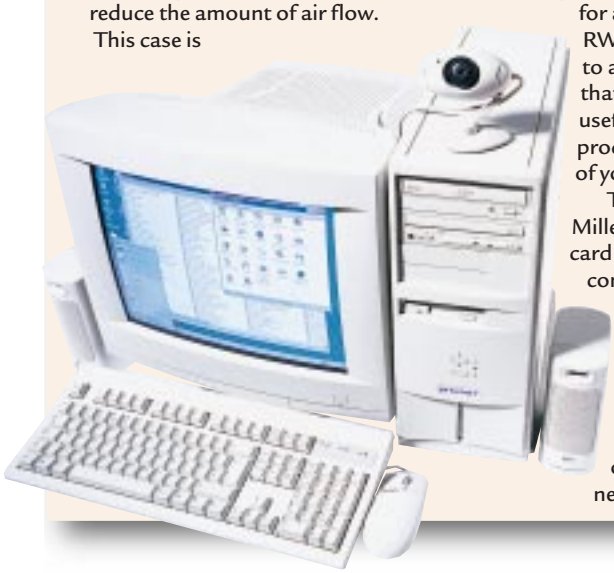
PCW DETAILS

Price *£1,173.82 (£999 ex VAT)*
Contact *Panrix 0113 244 4958*
www.panrix.com
Good points *DVD and Zip 100 drive included*
Bad points *The monitor could have been better*
Conclusion *A fast and well specified office workhorse that's up to any task*

Build Quality	★★★★★
Performance	★★★★★
Value for Money	★★★★
Overall Rating	★★★★★

Polar **Panache P3-500**

The core of the Polar is an Intel Pentium III clocked at 500MHz. Build quality is good, with cables neatly tied together out of the way. The side of the mini-tower case is secured with a thumbscrew that allows it to be removed easily. The only fault with the case is the cut-out in the rear, designed to be an opening for a second fan – there is no fan present, and this could reduce the amount of air flow. This case is slightly unusual in that it has sacrificed free 5.25in bays for free 3.5in bays, a factor to bear in mind if you are considering upgrading the basic spec. It does, however, have an unused rack for mounting a hard drive vertically at the front. Although, with a 25GB IBM drive, you are unlikely to need this though.



Polar has pushed the boat out on the spec of this machine and opted for a DVD-ROM and a CD-RW. The CD-RW allows you to archive material to media that cannot be overwritten – useful if you ever need to produce an accurate record of your files in court.

The 16MB Matrox Millennium G400 graphics card supports motion compensation during DVD playback and helps display a sharp image on the 17in Hansol monitor. The shadow mask tube is fairly good, with an easy-to-use, fold-out OSD. The RPTI network card was the only one to feature a standard RJ45 and a BNC connector, useful if you have only two machines and don't want to buy a hub. Finally, a Diamond SupraExpress V.90 modem takes care of dial-up access.

The Panache is a well-stacked machine, but it's a bit more expensive than some competitors.

PCW DETAILS

Price *£1,291 32 (£1,099 ex VAT)*
Contact *Polar 0161 482 7000*
www.polartechnology.com
Good points *CD-RW and DVD drive*
Bad points *A bit expensive*
Conclusion *A great office system, but more expensive than some*

Build Quality	★★★★
Performance	★★★★
Value for Money	★★★★
Overall Rating	★★★★

Serving up an ace

Even in a small network you shouldn't overlook the possibility of installing a Windows NT server. At first glance the extra outlay may seem to be a prohibitive step, after all, what can one additional machine really offer? However, the benefits are immense, and too numerous by far to list in this one small box, but there are several main points which should be explained.

Backup is probably the most important issue here. Sure, with a few networked Windows 98 machines you could just fit a tape drive into one machine, install some backup software, and then get users to create a single directory on their PC which you back up at set intervals. This approach works fine so long as your users realise that they need to leave their PCs turned on in order for this to work, and that you remember to leave the PC with the tape drive turned on.

Take a server on the other hand, and create user directories on that, and immediately you have created a single point for backups to be done. And as the server can just be left powered on all the time, information is always accessible. Now all that's left to do is to put the tape drive in the server, and schedule your backups to work on the local user directories.

▲A SERVER CAN HELP YOU SQUARE UP TO THE TASK OF CENTRALISING OFFICE COMMUNICATIONS AND BACKING UP YOUR DATA

A small server can offer more than this, both now and in the long term, with many applications actually needing a server in order to work correctly. Think of the Internet and email. Both are great facilities, and in this day and age can be useful tools for a small company, providing cheap communication. The problem that you are likely to have is in providing access for all members in your company to these services. A server can quite happily help you out here, with software already available to make all of this possible.

Installing an email package such as NT mail would allow your server to collect emails from your ISP and pass them on to your local users. The server could also serve as a proxy server to your ISP, and then everybody on the network would be able to use the Internet at the same time. Of course, you can buy additional hardware which will perform much the same job, but at the end of the day you are getting something with a lot more functionality.

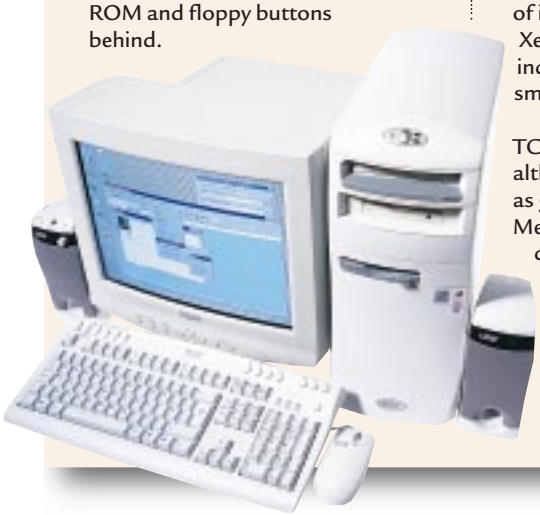
Don't ignore the ability to use a server to host additional software, such as a fax server, and you'll soon come to realise that centralising certain tasks around a server is one of the best steps that you can take when building a small-business network.

DAVID LUDLOW

Tiny **Office Powerhouse**

Tiny has built a fairly good machine, based on a 500MHz PIII and 128MB of RAM. This is the first time we have seen the new Tiny case, and it is certainly an improvement. There's more access room, which helps to keep the inside tidy and leaves more scope for upgrading.

Unfortunately, Tiny has insisted on covering the floppy and CD-ROM with extra covers. The covers have buttons on them that, when pushed, push the actual CD-ROM and floppy buttons behind.



This means that, annoyingly, you have to give the buttons a hard shove to get them to operate.

Inside the case, build quality is generally good, the one fault being that cables are positioned in front of the processor, when they could easily have been routed around it.

The inclusion of a DVD-ROM and a Zip drive is a bonus. If you want to watch DVD movies, then Tiny has done a licensing deal with ATi allowing it to ship the latest version of its excellent DVD player. The fast Xentor TNT2 Ultra graphics card includes motion compensation for smooth DVD playback.

The Taxan Ergovision 750 TCO95 17in monitor was excellent, although the display was not quite as good as the Taxan shipped with Mesh's system. This aperture grille display is crisp and sharp with an easy-to-use OSD. An Intel 10/100 NIC and a 56K modem keep the comms bases covered, while the 20GB hard disk offers amazing storage capacity.

This machine sits a clear £200 above the others in this test, making it difficult to recommend it over the others on offer here. Having said that, however, it does come bundled with the Professional version of Microsoft Office 2000 and may, therefore, still apeal to some.

PCW DETAILS

Price *£1,408.83 (£1,199 ex VAT)*
Contact *Tiny 01293 821 555*
www.tiny.com
Good points *Well built, good monitor*
Bad points *Comparatively poor value*
Conclusion *A promising machine that is let down by its price*

Build Quality	★★★★
Performance	★★★★
Value for Money	★★★
Overall Rating	★★★

Viglen **Homepro P3-500 DWR**

Viglen has given us a sensible specification that is well-suited to the job of a small business machine. Build quality is good with components situated to get the most out of the case. Cables have been neatly tied around the processor and out of the way of the memory slots and system fan outlet.

The combination of a 500MHz Pentium III and 128MB of RAM is a popular specification this month, producing a system that is more than a match for any office task. Viglen has opted for a 16MB Matrox Millennium G400 graphics card combined with a good rebadged ADI E55 17in shadow mask monitor. The resulting image is clear and crisp. The Pioneer DVD-ROM drive will allow you to read DVD software or while away your office lunch hour watching movies. A Panasonic LS-120 drive isn't the best removable storage option, but it does let you use standard floppies as well as the 120MB SuperDisks.

There's plenty of room for storage as Viglen has chosen a massive 20GB Western Digital hard drive. Only one PCI slot remains unused on the MSI motherboard, although you may find it difficult to install some cards in it as the heat sink on the graphics card protrudes slightly into the PCI slot below.

Two ISA slots are free, with the shared slot taken by the Creative SoundBlaster audio PCI 128 sound card. The US Robotics V.90 modem and Intel Pro 100 network card provide solid communication.

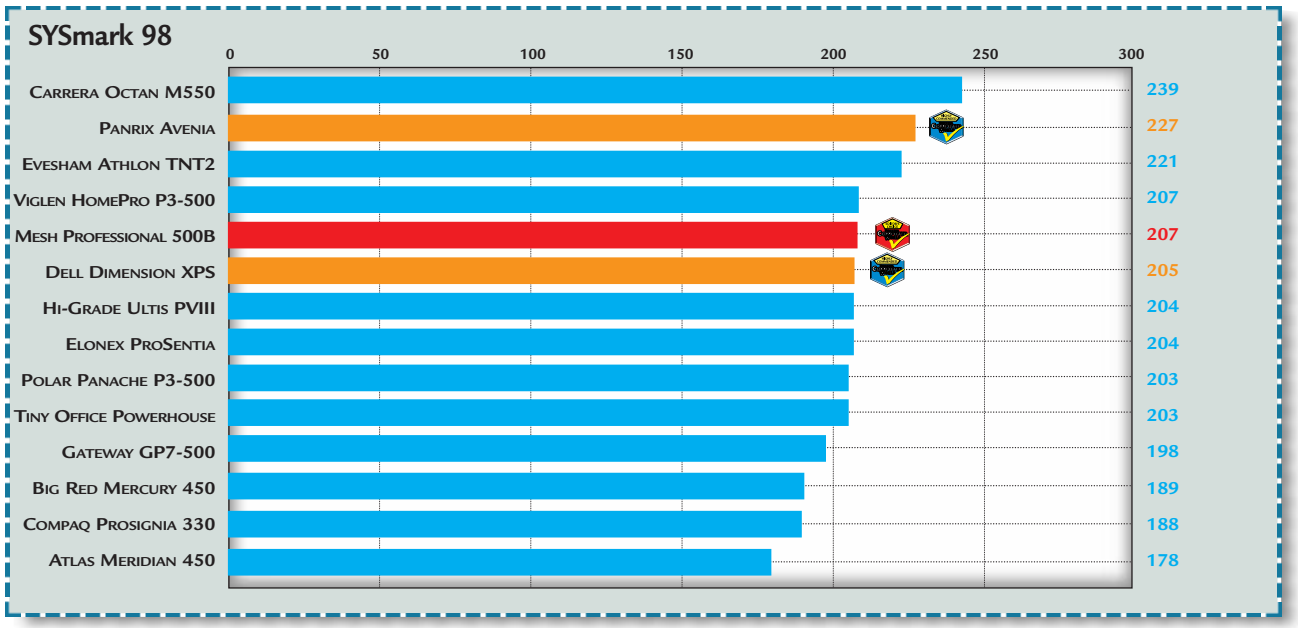
The keyboard is slightly unusual in that the keys feel slightly rough as though it is unfinished, making it uncomfortable to type on. Microsoft Works Suite 99 is a decent enough office bundle, although there are better packages on offer from the competition.

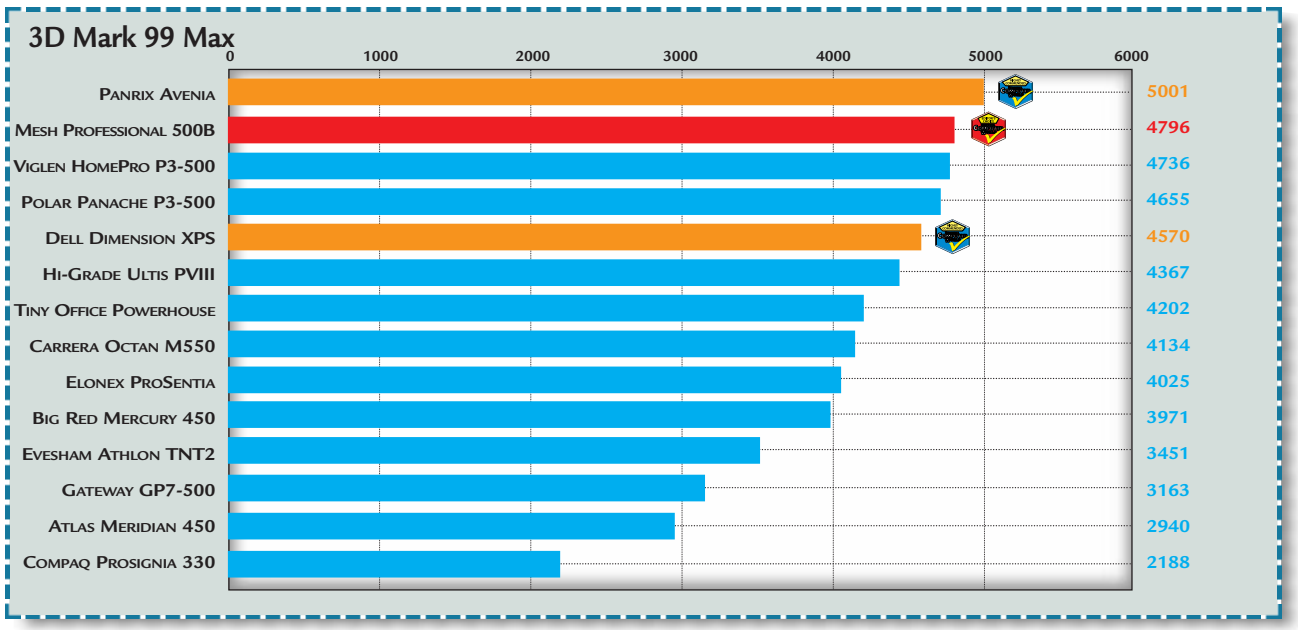
PCW DETAILS

Price *£1,173.82 (£999 ex VAT)*
Contact *Viglen 0181 758 7000*
www.viglen.co.uk
Good points *Well built, large hard drive, LS-120 drive*
Bad points *A better office suite could have been bundled*
Conclusion *A good machine that just misses out on an award this month*

Build Quality	★★★★★
Performance	★★★★
Value for Money	★★★★
Overall Rating	★★★★

PCW Labs Report





How we did the tests

■ **SYSmark measures** the time it takes a PC to perform tasks in 14 common office and content-creation apps. Each test is run three times to ensure consistency. Tests include:

☛ **Office productivity:** CorelDraw 8, Excel 97, NaturallySpeaking 2.02, Netscape Communicator 4.05, OmniPage Pro 8.0, Paradox 8, PowerPoint 97 and Word 97.

☛ **Content Creation:** MetaCreations Bryce 2, Avid Elastic Reality 3.1, Macromedia Extreme 3D 2, Photoshop 4.01, Adobe Premiere 4.2, and XingMPEG Encoder 2.1.

■ **3DMark99 Max** is an instruction-set optimised version of 3DMark99 from Futuremark Corporation, which tests the 3D capabilities of PCs. When applicable, the suite of tests will draw on AMD's 3DNow! or Intel's KNI instruction sets. It uses a Real World DirectX 6.1 3D game engine to produce one result from a balanced testing methodology that includes image quality, rendering speed, CPU capability and, depending on hardware support, a test for embossed bump-mapping. All tests are performed at 1,024x768 resolution in 16bit colour depth with the test suites set to loop three times. The higher the score, the better the result. However, due to the implementation of instruction-set optimisation, the results from the original 3DMark99 and the Max version are not comparable. See www.3dmark.com.

Table of features

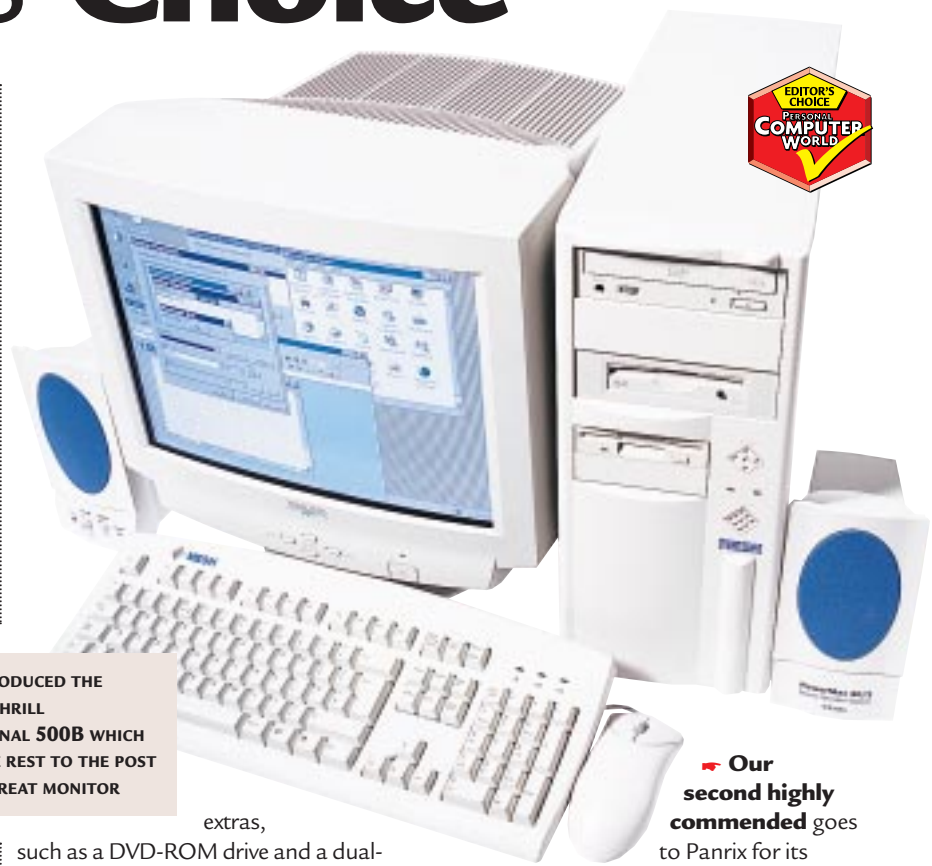
Manufacturer	Atlas	Big Red	Carrera	Compaq	Dell	Elonex
Model Name	**Meridian 450**	**Mercury 450**	**OCTAN M55O**	**Prosignia 330**	**Dimension XPS T500**	**ProSentia**
Price ex VAT (inc VAT)	£1,075 (£1,263.13)	£999 (£1,173.82)	£999 (£1,173.82)	£925 (£1,090.40)	£999 (£1,173.82)	£999 (£1,173.82)
Telephone	0181 532 6515	08700 711 117	0181 307 2800	0845 270 4000	0870 152 4850	0171 452 4444
Fax	0181 532 6517	08700 733 337	0181 307 2857	0845 270 4100	01344 723 695	0171 452 6422
URL	www.atlasplc.com	www.bigred.co.uk	www.carrera.co.uk	www.compaq.co.uk	www.dell.co.uk	www.elonex.co.uk
Hardware Specs						
Processor	AMD K6 III 450	Pentium III 450	Athlon 550	Pentium III 450	Pentium III 500	Pentium III 500
RAM/Type	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM
Occupied RAM slots/Spare RAM Slots	1/3	1/3	1/2	3/0	1/2	1/2
Maximum memory in this configuration	896MB	768MB	640MB	128MB	640MB	640MB
Maximum memory supported by motherboard	1GB	1GB	768MB	768MB	768MB	768MB
Hard Disk (manufacturer + model)	Western Digital 18000	IBM Deskstar	Maxtor	IBM Deskstar	IBM Deskstar	Fujitsu MPD3113AH
HD size/interface	18GB/EIDE	25GB/EIDE	14GB/EIDE	9.1GB/EIDE	13.6GB/EIDE	13.7GB EIDE
Storage Drive model and manufacturer	Panasonic Zip	LS-120	None	None	Sony CRX-100e CDRW	None
Size of storage drive media	100MB	120MB	N/A	N/A	650MB	N/A
Storage drive interface	EIDE	EIDE	N/A	N/A	EIDE	N/A
Motherboard Components						
Motherboard Manufacturer	TMC	Asus	MSI	Compaq	Intel	MSI
L2 Cache	256K	512K	512K	512K	512K	512K
No of 3.5/5.25in bays	2/3	3/4	3/4	2/3	3/2	3/1
No of free 3.5/5.25in bays	1/2	1/3	1/3	1/2	2/0	1/0
No of PCI/ISA/shared slots	6/0/0	5/0/1	4/1/1	3/1/1	4/0/1	2/0/1
No of free PCI/ISA/shared slots	3/0/0	2/0/1	1/1/1	1/1/0	1/0/1	0/0/1
No of USB/Serial/Parallel/PS2	2/2/1/2	2/2/1/2	2/2/1/2	2/2/1/2	2/2/1/2	2/2/1/2
Multimedia						
CD-ROM manufacturer/model	Hitachi DVD GD-2500	Actima 40x	Panasonic	Compaq CRD 8322B	Toshiba SD-1212	Acer
CD-ROM speed/interface	32/EIDE	40/EIDE	32/EIDE	40/EIDE	32/EIDE	40/EIDE
Sound card manufacturer	Creative	Creative	Aureal	Creative	Turtle Beach	Creative
Sound card model	SoundBlaster 128	SoundBlaster 128	Vortex 320 Voice PCI	SoundBlaster 64V	Montego II	SoundBlaster 64V
Speakers (manufacturer + model)	Samsung	None	Altec Lansing ACS43	None	Altec Lansing ACS340	Creative SBS20
Graphics card manufacturer and model	Atrend TNT2 32MB	Riva TNT2 32MB	Maxigamer Cougar TNT2	STB Velocity 4400	3dfx Voodoo 3 3000	Riva TNT2
Chipset	Riva TNT2	Riva TNT2	Riva TNT2	Riva TNT	Voodoo 3	Riva TNT2
RAM/Max RAM and type	32MB/32MB/SDRAM	32MB/32MB/SDRAM	32MB/32MB/SDRAM	16MB/16MB/SDRAM	16MB/16MB/SDRAM	32MB/32MB/SDRAM
Graphics card interface	AGP	AGP	AGP	AGP	AGP	AGP
Monitor manufacturer/model	ADI E55	Viewsonic E771	HANSOL 710a	Compaq S700	Dell M770	Elonex MN044
Monitor size/Max viewable diagonal	17in/16in	17in/16in	17in/16in	17in/16in	17in/16in	17in/16in
Max resolution and refresh	1,600x1,200/ 75Hz	1,280x1,024/66Hz	1,280x1,024/60Hz	1,280x1,024/60Hz	1,280x1,024/60Hz	1,280x1,024/60Hz
Other Information						
Modem manufacturer and model	Accord 56K	Diamond V.90	E-tech 56K	Compaq 56K PCI modem	US Robotics V.90	US Robotics 56K
Highest supported modem standard	V.90	V.90	V.90	V.90	V.90	V.90
Misc hardware	Dlink network card 550CT	Realtek RTL8139 10/100	Realtek RTL8139 10/100	Compaq nc3120 Ethernet	3Com 3C905 NIC	Intel 10/100 network card
Bundled software	Lotus SmartSuite	Lotus SmartSuite	Lotus SmartSuite	Microsoft Office 2000 SBE	Worksuite 99 Cinemaster DVD Solution McAfee AV Trial Version	Microsoft Office 2000 std
Standard warranty	3 yrs on-site	1yr on-site	2 yrs on-site	1 yr on-site + 2yrs RTB	1 yr on-site + 2yrs RTB	1 yr on-site + 2 yrs RTB
Warranty options		3 yrs on-site	3 yrs on-site	3 yrs on-site	3 yrs on-site	Extensions available
Technical support tel no	0181 532 6199	08700 722 227	0181 307 2830	Not supplied	0870 908 0800	0181 452 6666
Sales hours	Mon-Sat 9-5.30	Mon-Fri 9-6	Mon-Fri 9-6. Sat 10-4	N/A	Mon-Fri 8-8 Sat 9-6 Sun 10-5	Mon-Fri 8.30-6.30 Sat 9-1.30
Technical support hours	Mon-Sat 9 - 5.30	Mon-Fri 9.00 - 6.00	Mon-Fri 9-6 Sat 10-4	N/A	Mon-Fri 8-8	Mon-Fri 8-8 Sat 9-1.30

Evesham	**Gateway**	**Hi-Grade**	**Mesh**	**Panrix**	**Polar**	**Tiny**	**Viglen**
Athlon TNT2	**GP7-500**	**Ultis PVIII**	**Professional 500B**	**Avenia**	**Panache P3-500**	**Office Powerhouse**	**HomePro P3-500DWR**
£1,049 (£1,232.58)	£988 (£1,160.90)	£1,075 (£1,263.13)	£999 (£1,173.83)	£999 (£1,173.83)	£1,099 (£1,291.33)	£1,199 (£1,408.83)	£999 (£1,173.83)
0800 038 0800	0800 552 000	0181 532 6100	0208 208 4706	0113 244 4958	0161 482 7000	01293 821 555	0181 758 7000
01386 769795	00 353 1 803200	0181 532 6101	0208 208 4793	0113 244 4962	0161 4827007	01293 782 663	0181 758 7080
www.evesham.com	www.gateway.com/uk	www.higrade.com	www.meshplc.co.uk	www.panrix.com	www.polartechnology.com	www.tiny.com	www.viglen.co.uk
Hardware Specs							
Athlon 500	Pentium III 500	Pentium III 500	Pentium III 500	Athlon 500	Pentium III 500	Pentium III 500	Pentium III 500
128MB/SDRAM	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM
1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
640MB	640MB	640MB	640MB	640MB	640MB	640MB	640MB
768MB	768MB	768MB	768MB	768MB	768MB	768GB	768MB
Maxtor 5120	Quantum Ultra ATA	IBM Deskstar	Western Digital WDAC31300	IBM Deskstar	IBM Deskstar	Western Digital	Western Digital WD205BA
20GB/EIDE	13.2GB/EIDE	14GB/EIDE	13GB/EIDE	13.5GB/ EIDE	25GB/EIDE	20.5GB/EIDE	20GB/EIDE
Iomega Zip	Iomega Zip	Panasonic Zip	Iomega Zip	Iomega Zip	CD-RW Mitsumi CR-2801TE	Iomega Zip	Panasonic LS-120
100MB	100MB	100MB	100MB	100MB	640MB	100MB	120MB
EIDE	EIDE	EIDE	EIDE	EIDE	EIDE	EIDE	EIDE
Motherboard Components							
MSI	Intel	Asus	Asus	MSI	Epox	MSI	MSI
512K	512K	512K	512K	512K	512K	512K	512K
4/3	3/2	4/3	4/3	2/2	4/2	3/3	4/2
2/2	1/0	1/2	1/2	0/1	2/0	1/1	2/1
5/2/1	4/0/1	3/2/1	3/2/1	4/1/1	4/1/1	3/2/1	3/2/1
3/2/1	3/0/0	1/2/0	1/2 0	1/1/1	1/1/1	1/2/0	1/2/0
2/2/1/2	2/2/1/2	2/2/1/2	2/ 2/1/2	2/2/1/2	2/2/1/2	2/2/1/2	2/2/1/2
Multimedia							
Samsung SC140	LG	Asustek CD-S400	Pioneer DVD-113	Toshiba DVD SD-M1212	Toshiba DVD SDM1212	Panasonic DVD SR8584	Pioneer DVD 113
40/EIDE	40/EIDE	40/EIDE	32/EIDE	32/EIDE	32/EIDE	32/EIDE	32/EIDE
Creative	None	Creative	Creative	Creative	Adonics	Yamaha	Creative
SoundBlaster 64V	N/A	SoundBlaster 128	SoundBlaster 128	SoundBlaster 128	SB16 Comp PCI	DS-XG	SoundBlaster 128
ZYFI OEMs	None	Samsung SMS-7841	Teac Powermax 80	Genius Fantasia SP-G10	None	Tiny CPR-50	ADI clip-on speakers
Chaintech Desp. R160	ATi Rage 128	A-Trend TNT2 32MB	Matrox G400 Dualhead	Matrox G400	Matrox G400	Guillemot Maxigamer Xen.	Matrox G400
Riva TNT2	Rage 128	Riva TNT2	G400	G400	G400	Riva TNT2	G400
32MB/32MB/SDRAM	16MB/16MB/SDRAM	32MB/32MB/SDRAM	16MB/16MB/SGRAM	16MB/16MB/SGRAM	16MB/16MB/SGRAM	16MB/16MB/SDRAM	16MB/16MB/SGRAM
AGP	AGP	AGP	AGP	AGP	AGP	AGP	AGP
Mg Innovation 177EV	Gateway VX700	Sampo 812R	Taxan 755 TCO99	Hitachi CM650ET	Hansol B17BL	Taxan 750 TCO 95	ADI E55
17in/16in	17in/15.9in	19in/18in	17in/16in	17in/16in	17in/16in	17in/16in	17in/16in
1,600x1,200/60Hz	1,600x1,200/65Hz	1,600x1,200/75Hz	1,600x1,200/85Hz	1,280x1,024/75Hz	1,600x1,200/66Hz	1,600x1,200/65Hz	1,280x1,024/65Hz
Other Information							
Diamond SupraExpress	Telepath Pro 56K	Accord 56K	Diamond SupraExpress	Diamond SupraExpress	Diamond SupraExpress	Etech K56 Flex	3Com winmodem
V.90	V.90	V.90	V.90	V.90	V.90	V.90	V.90
Intel Pro 10/100 NIC	US Robotics 10/100	SMC 10/100 network card	Intel Pro 10/100 Pro	Intel Pro 100 M. adaptor	RPTI Ethernet adaptor	Intel 10/100 network card	Intel Pro 100+ M. adaptor
Lotus SmartSuite	Lotus SmartSuite	Lotus SmartSuite	Corel WordPerfect Office 2000	Lotus SmartSuite	Lotus SmartSuite	MS Office 2000 Pro	MS Works Suite 99
2 yrs on-site	1 yr on-site + 2 yrs RTB	3 yrs on site	2 yrs on-site	1 yr on-site + 2 yrs RTB	3 yrs RTB	1 yr on-site	1 yr RTB (carriage paid)
3 years on-site	3 yrs on site		3 yrs on-site		1 yr on-site	5 yrs on-site	3 yrs on-site
0800 496 4636	0113 244 4948	0181 532 6199	0208 208 4795	0113 244 4948	0161 482 7044	0870 1699699	0181 758 7050
Mon-Fri 9-7 Sat 9-5.30 Sun 10-4	Mon-Fri 9.30-5.30 Sat 10-4	Mon-Fri 9-9	Mon-Fri 9-6 Sat 10-4 Sun 10-2	Mon-Fri 9.30-5.30 Sat 10-4	Mon-Fri 9-6 Sat 10-1	Mon-Fri 9-5.40	Mon-Fri 9-5.30 Sat 9-1
Mon-Sat 9-5.30	Mon-Fri 9.30-5.30 Sat 10-4	Mon-Fri 9-9	Mon-Fri 9-5.30	Mon-Fri 9.30-5.30 Sat 10-4	Mon-Fri- 9-6. 10-1	Mon-Fri 9-5.30	Mon-Fri 9- 5.30 Sat 9-1

Editor's Choice

Buying a PC for your office is always a daunting prospect, but many of the machines here would be well up to the task. We were generally impressed by the systems that we saw from most of the manufacturers. Many of them submitted machines that surpassed the standard grey boxes of old. A Zip 100 was the most popular storage drive, enabling you to transport larger files while ensuring the maximum possible compatibility. Some of the manufacturers even stretched to a CD-RW demonstrating that larger-capacity storage is now more affordable than ever.

When it came to giving out awards, we found ourselves agonising over small value for money issues such as the bundled software and the inclusion of a separate storage drive. While we were in the process of writing this group test, a sharp rise in the price of memory affected all the manufacturers' costs. It was interesting to note that some chose to absorb this extra overhead while others decided to pass it on to the consumer. However, we are hoping that RAM won't stay at this inflated level for much longer.



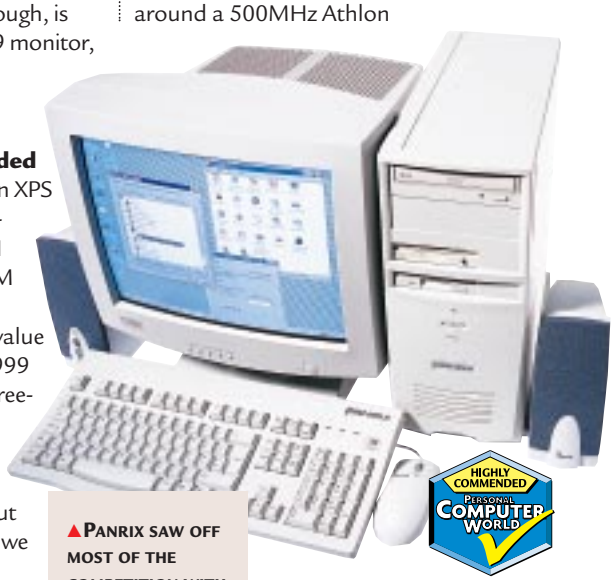
▶ MESH PRODUCED THE BUILT-TO-THRILL PROFESSIONAL 500B WHICH PIPPED THE REST TO THE POST WITH ITS GREAT MONITOR

Our Editor's Choice this month goes, once again, to Mesh. The Professional 500B is an excellent machine, designed with a small business in mind. Not only has Mesh included a fast 500MHz Pentium III processor and 128MB of RAM, but it has also thrown in a lot of extras, such as a DVD-ROM drive and a dual-head Matrox graphics card. A two-year on-site warranty will provide you with some peace of mind in case something goes wrong. The real bonus, though, is the gorgeous Taxan 755 TCO99 monitor, a display that you will have no problem looking at all day.

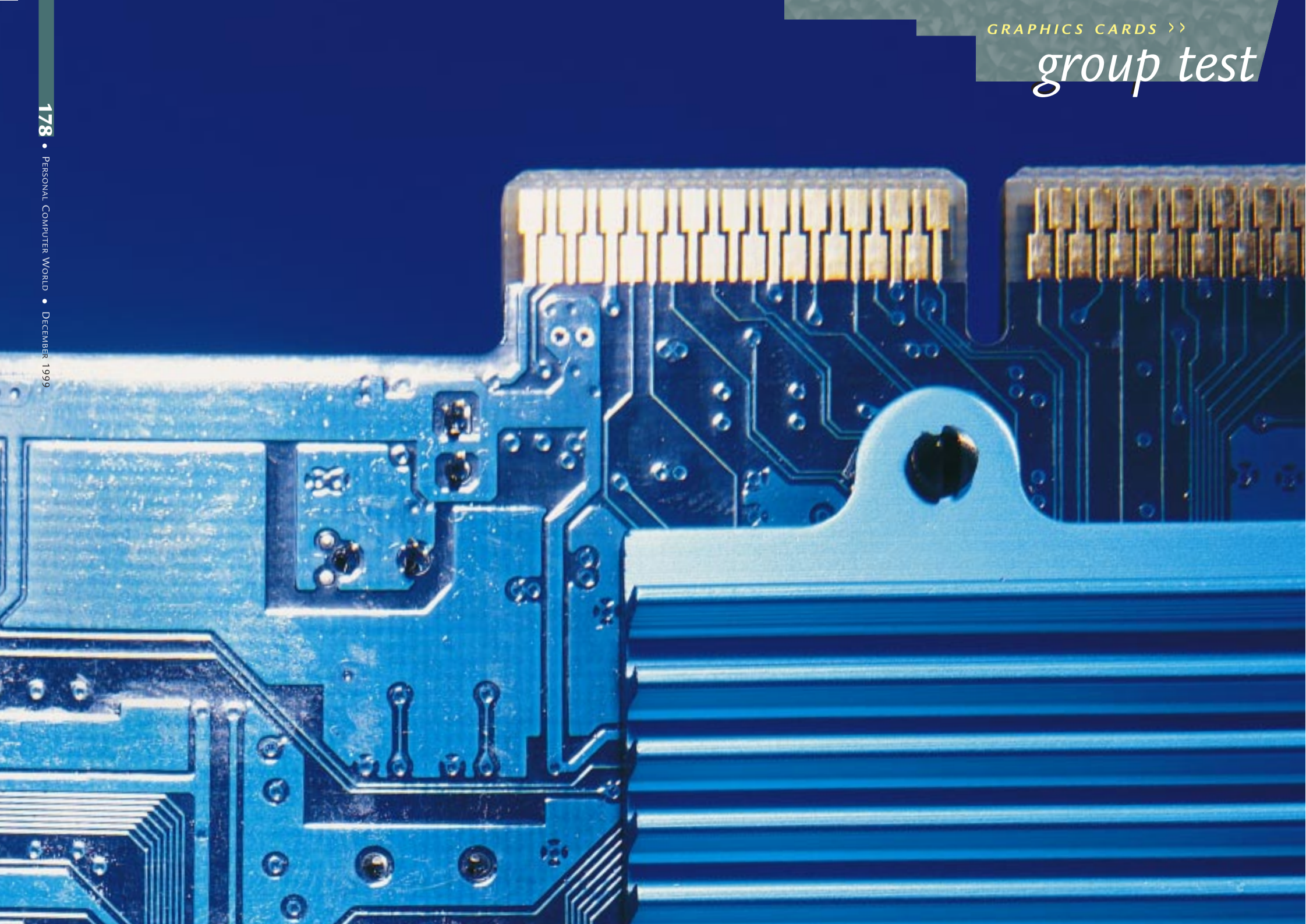
Our first highly commended award goes to Dell's Dimension XPS T500. This is an extremely well-stacked machine. A Pentium III 500, 128MB of RAM and a CD-RW represent excellent value for money at just £999 excluding VAT. A three-year warranty (with the first year on-site) is a welcome addition to the spec. Dell lost out to Mesh as we felt that a better monitor would be slightly more desirable for businesses than a CD-RW, but it is an excellent system.

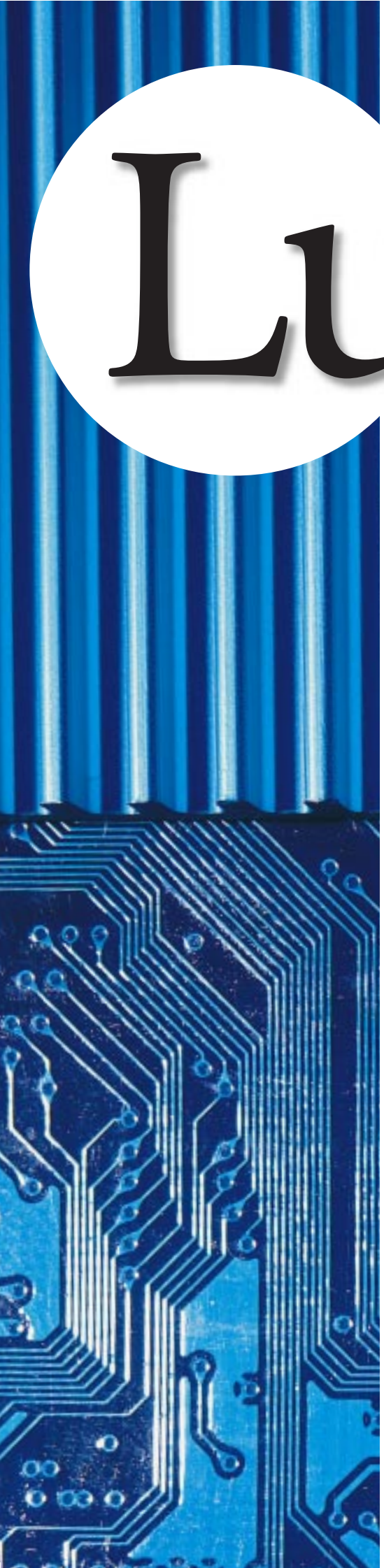
▼ DELL, WITH ITS KNOWLEDGE OF THE BUSINESS MARKET, HAS COME UP WITH A DELECTABLE MACHINE

Our second highly commended goes to Panrix for its Avenia, which just stole it away from the remaining competition. Panrix built its machine around a 500MHz Athlon processor that outperformed the Pentium III 500MHz processors on our SYSmark 98 benchmark by a clear 20 points. This, combined with a three-year warranty and Lotus SmartSuite Millennium, makes the Panrix a deserving winner in this hard-fought group test. ❐



▲ PANRIX SAW OFF MOST OF THE COMPETITION WITH THE AVENIA





Luck of the draw

It's easy to get dealt a bad hand when buying a graphics card, so *PCW* is pleased to introduce a little risk management...

There's been a lot of activity on the graphics cards front recently, with faster chipsets from the likes of nVidia and Matrox as well as takeovers and acquisitions such as S3 with Diamond and 3dfx with STB. There's also been a major change in the graphics subsystem infrastructure with new motherboard chipsets, like Intel's 820 design, flaunting the much talked about AGP 4x interface. With all these factors in mind, *PCW* decided it was time to test the latest and greatest cards available on the hottest technology around.

AGP 4x promises increased graphics performance by doubling the transfer rate of the bus from 528MB/sec up to a whopping 1056MB/sec, according to Intel's figures.

To enable us to put the cards through their paces properly, we borrowed an AGP 4x equipped 820 chipset motherboard, coupled with a 600MHz Pentium III running at 133MHz. We also used128MB of RAMBUS memory.

To see what the cards output really looked like, we connected this all up to a 19in Mitsubishi 900u monitor. So, if you want to know which cards are hot and if AGP 4x really does deliver that performance boost you've been holding out for, read on.

Ratings

★★★★★ **Highly recommended**
★★★★ **Great buy**
★★★ **Good buy**
★★ **Shop around**
★ **Not recommended**

Contents

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• *Tested and reviewed by Riyad Emeran, Will Head and Jason Jenkins*

3dfx Voodoo3 2000

This is the baby of the Voodoo3 family, with a core clock speed of only 143MHz and a 300MHz RAMDAC. Like the other cards in the range, the 2000 supports both Direct3D and OpenGL as well as GLide. GLide is 3dfx's proprietary 3D standard, and there was a time when all 3D games were coded in GLide first, and then ported to other standards. During this period, it was vital to have a 3dfx-based card if you wanted to play the latest games. Now, however, GLide is rarely seen.

As with all of the Voodoo3 cards, the 2000 is struggling to keep up with the competition, only just managing a score over 30fps (frames per second) in Quake II at 1,024x768. There's 16MB of SDRAM on-board, which seems a little inadequate compared to all the 32MB cards on test. However, there is one thing that makes the Voodoo3 2000 worth considering – the price. At just £69 (ex VAT) it's an affordable solution for someone upgrading to 3D gaming. Don't expect the best performance available, but what you do get is worth the asking price.

PCW DETAILS

★★★

Price *£81.07 (£69 ex VAT)*
Contact *Dabs Direct 0800 138 5142*
www.3dfx.com
Good points *Very affordable*
Bad points *Not the best performer*
Conclusion *A good budget 2D/3D video card*

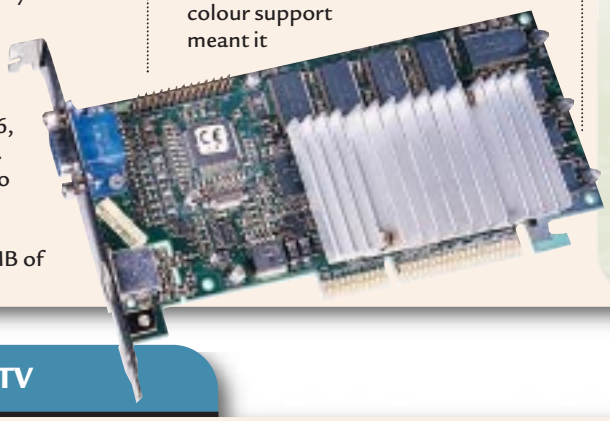
3dfx Voodoo3 3000

The middle offering in 3dfx's Voodoo3 range was once the most sought after graphics card around. But since the market moves at such an incredible pace, it didn't take long for something better and faster to come along.

The core clock frequency is 166MHz, and the 350MHz RAMDAC allows for an impressive 75Hz refresh rate at a 2D resolution of 2,046x1,536, with 16.7 million colours. However, you're limited to 65,000 colours in a 3D environment.

Also, there's only 16MB of SDRAM on board, which could be a problem if a game starts to shift very large textures.

In terms of performance, the Voodoo3 3000 is starting to look a bit tired – the frame rates in Quake II and III were nothing to write home about, and the lack of 32bit colour support meant it couldn't run a number of the tests.



However, with a price of only £89 (ex VAT), it's fairly cheap and a better all-rounder than the VideoLogic Neon 250.

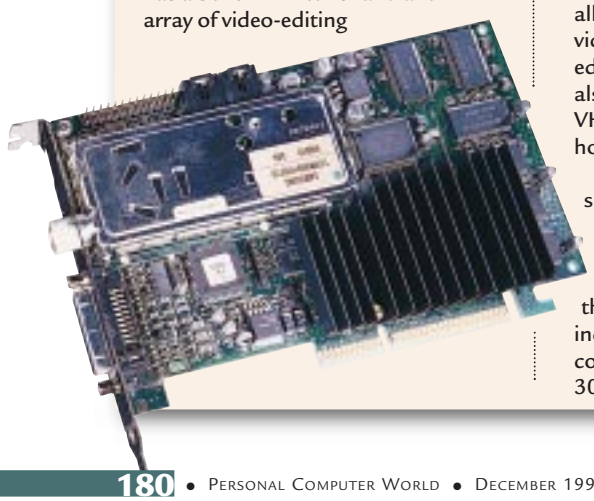
PCW DETAILS

★★

Price *£104.57 (£89 ex VAT)*
Contact *Dabs Direct 0800 138 5142*
www.3dfx.com
Good points *Reasonable performance for the price*
Bad points *Can't run high-colour depths in 3D*
Conclusion *A once great card, now eclipsed by its peers*

3dfx Voodoo3 3500 TV

The Voodoo3 3500 TV is quite a versatile card – as well as being a 2D/3D graphics accelerator, it also has a built-in TV tuner and a full array of video-editing features. The card ships with a separate box that has inputs and outputs for left and right audio, composite video and S-Video. This allows you to capture audio and video from a variety of sources and edit it or store it on your PC. You can also output edited video back to VHS, to get the final cut of your holiday movies.



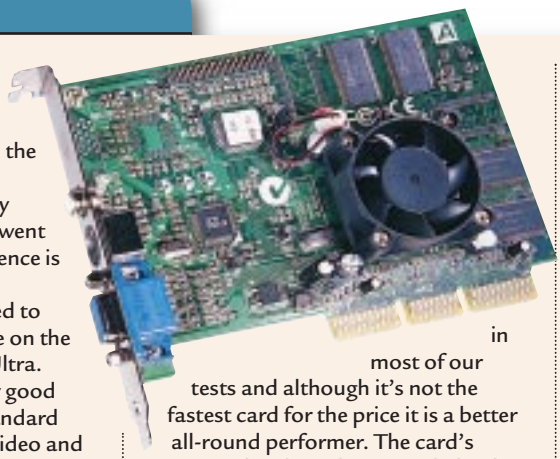
Unfortunately, the 3500 TV suffers from many of the same problems as the other Voodoo3 cards, one of which is the lack of 32bit colour support in 3D. Even though the 3500 TV runs at an increased core speed of 183MHz compared to the 166MHz of the 3000, it still can't compete with much of the competition when it comes to raw power. That said, the performance is still good enough to play the latest crop of 3D games, and if you're after a TV tuner and video editing features it's worth a look.

PCW DETAILS

★★★★

Price *£186.82 (£159 ex VAT)*
Contact *Dabs Direct 0800 138 5142*
www.3dfx.com
Good points *Great bundle with TV tuner*
Bad points *No 32bit colour*
Conclusion *An excellent feature set for the budding video editor*

AOpen **PA3000 Plus**



This card uses a main chip from nVidia – the Riva TNT2 Model 64 – which is positioned between the value and the performance markets. There weren't many details on the chip when we went to press, but the main difference is that this version has a 64bit memory interface as opposed to the 128bit memory interface on the standard TNT2 and TNT2 Ultra.

Overall, this card is fairly good value – in addition to the standard D-SUB connector, it has S-Video and composite connectors. For only £75 (ex VAT), it is a fair compromise between performance and functionality. It sits roughly mid-table in most of our tests and although it's not the fastest card for the price it is a better all-round performer. The card's 32MB of on-board memory helped it complete our higher resolution tests.

An on-chip fan keeps heat to a minimum, which may seem excessive, but if you want to over-clock it using the supplied utility, you'll want as much cooling as you can get. Unfortunately, a software DVD player is not bundled with the card.

PCW DETAILS

★★★

Price *£88.13 (£75 ex VAT)*
Contact *First Hardware 01296 505101*
www.aopen.nl
Good points *S-Video and composite ports*
Bad points *There are faster cards here*
Conclusion *A fair compromise between speed and value*

AOpen **PA3020**

It is interesting to see the difference between a TNT2 and a TNT2 Ultra chip. This card has the latter, and it certainly gives it a performance boost over the AOpen PA3000 Plus. We tested the 32MB version of this card, but AOpen also produces a 16MB version for £47 less (ex VAT). The fact that this is an AGP 4x board has not helped it in the performance stakes – it consistently lost out to Creative's TNT2 Ultra card. The board supports all the usual TNT2 features, such as 32bit colour in 3D games and 24bit Z buffer. The card also has composite and S-Video out-ports.

AOpen has included a clock-tuning facility as part of its standard drivers. This useful utility lets you run the chip and the memory faster than the standard levels. This is done at your own risk, although the fan will try to help keep the build up of heat at a tolerable level. Although this is a fairly fast card, it's only slightly cheaper than the award-winning Matrox Millennium G400 Max.

PCW DETAILS

★★★

Price *£175.08 (£149 ex VAT)*
Contact *First Hardware 01296 505101*
www.aopen.nl
Good points *Fast chip, S-Video and composite connectors*
Bad points *No DVD player*
Conclusion *Overall it's a good card, but it doesn't offer anything more than Creative's cheaper TNT2 Ultra board*

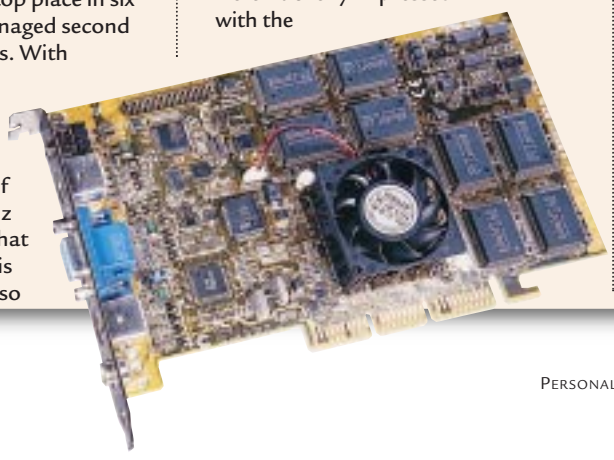
Asus **AGP-V3800 Deluxe**

HIGHLY COMMENDED Personal COMPUTER WORLD

Asus is best known for its high-quality motherboards, but this nVidia Riva TNT2 Ultra-based graphics card shows that the company is capable of turning its hand to more than one market.

The V3800 Deluxe is an incredibly fast card – it grabbed top place in six of the 11 tests and managed second position in three others. With performance like this, you'll be able to get the most out of any 3D game.

The card's 32MB of SGRAM and a 300MHz RAMDAC make sure that almost any resolution is within your reach. It also has an array of extra ports. There are composite and S-Video out-ports as well as a connector for an external TV tuner box (sold separately). A pair of bundled 3D glasses are supposed to create a virtual reality environment for you to play your games in, but we weren't overly impressed with the effect. However, we were pleasantly surprised to find that Asus had also supplied S-Video and composite video cables in the box.



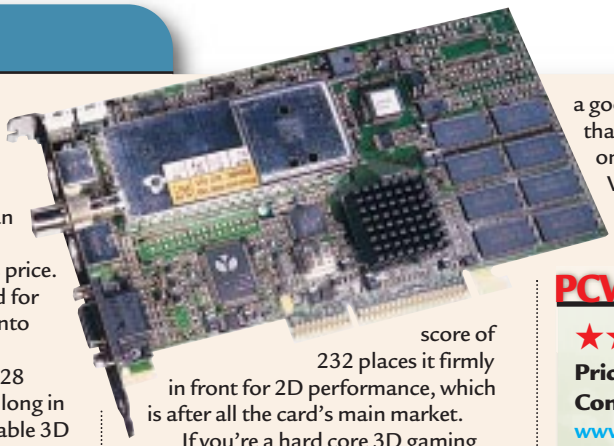
3D glasses aside, the Asus is still a great card – especially if you are looking for raw graphics power.

PCW DETAILS

★★★★

Price *£197.40 (£168 ex VAT)*
Contact *Micro Direct 01612 484 848*
www.asus.com
Good points *A very fast performer*
Bad points *Relatively expensive*
Conclusion *A very fast card with a couple of interesting features*

ATi All-in-Wonder 128



Combining 3D acceleration, a TV tuner, video in and out, MPEG hardware assistance and a wealth of accessories is no mean feat and ATi should be commended for doing it at this price. The All-in-Wonder is a godsend for those wanting to dip their toe into the world of video editing.

This card utilises the Rage128 chipset which, although a little long in the tooth, still provides reasonable 3D performance at lower resolutions (27.2fps running Quake III at 1,024x768 16bit). If you increase the resolution however, the All-in-Wonder does start to struggle. Its SYSmark score of 232 places it firmly in front for 2D performance, which is after all the card's main market.

If you're a hard core 3D gaming fan, then this card won't be able to deliver the results you desire. However, if you'd rather have a DVD player, TV tuner and the ability to create your own movies, then the All-in-Wonder is a good choice. If it weren't for the fact that other companies were getting in on the act (such as 3dfx with the Voodoo3 3500 TV) then ATi would have this specialist market sewn up.

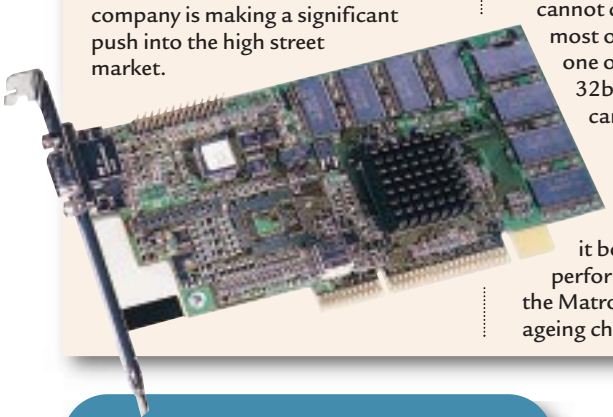
PCW DETAILS

★★★★

Price *£158.63 (£135 ex VAT)*
Contact *Dabs Direct 0800 138 5142*
www.ati.com
Good points *TV tuner, Hardware MPEG assistance*
Bad points *Poor 3D performance*
Conclusion *Good feature set, but the 3D performance lets this card down*

ATi Rage Fury 16MB

ATi has made a success of designing and marketing its own graphics cards over a number of years, and the vast majority of its income is derived from bulk sales to OEMs. With this card, however, the company is making a significant push into the high street market.



This version is based on the Rage 128 GL chipset, a chip that was fairly good in its day, but is near retirement now. In a market where just a few months can mean your technology is out of date, this year old chip simply cannot deliver the same speed as most of the others on test. It was one of the first cards to support 32bit colour in 3D and it still can – albeit slowly.

The 16MB of SDRAM on this card means it could not run some of the higher resolution tests. Although it boasts excellent 2D performance, finishing just behind the Matrox cards in our tests, but its ageing chipset meant that it couldn't deliver on 3D and it was beaten by the newer contenders.

Despite being one of the cheapest cards here, we would recommend saving for a bit longer and buying one of the award winners.

PCW DETAILS

★★

Price *£72.85 (£62 ex VAT)*
Contact *Dabs Direct 0800 138 5142*
www.ati.com
Good points *Low cost*
Bad points *Outdated chipset*
Conclusion *Not a card that stands out amongst its competitors*

ATi Rage Fury 32MB TV-Out

This is definitely the better of the two Fury cards, although we wouldn't recommend buying it for its 3D speed. Based on the Rage 128 GL with a RAMDAC of 250MHz, this 32MB SDRAM card at least managed to complete all of the performance tests. The Rage 128 GL broke new ground when it shipped with 32MB of memory, but now this is common place.

The board has both S-Video and composite connectors. These enable you to send the video signal to your television, although the resolution you'll be able to run at will be severely limited. The Rage 128 GL chip includes iDCT hardware acceleration, which will take the load away from your processor when you're playing DVD movies. Combined with the excellent ATi DVD player (which uses the Cinemaster engine), it yields excellent MPEG2 playback results. If you want to watch DVDs on your TV using your PC as the player, then this is a cheap way of doing it, but it might be worth waiting for the release of the Rage Fury Pro in the New Year.

PCW DETAILS

★★★

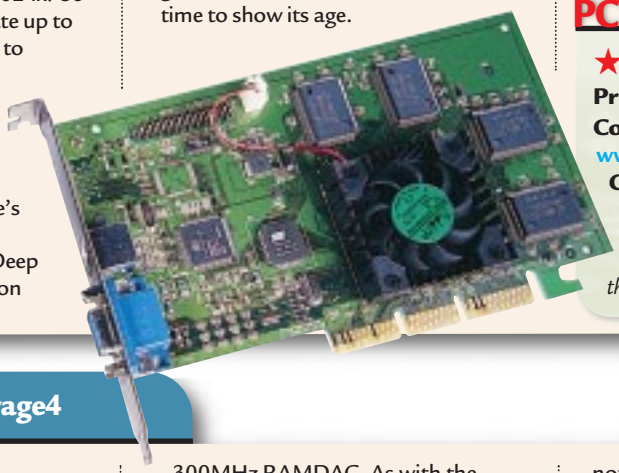
Price *£111.63 (£95 ex VAT)*
Contact *Dabs Direct 0800 138 5142*
www.ati.com
Good points *S-video and composite connectors*
Bad points *Poor 3D performance*
Conclusion *A good buy a few months ago, but a bit outdated now*

Creative **3D Blaster Riva TNT2 Ultra**

Of the two Creative cards in our test, the Riva TNT2 Ultra offers better performance, but with a price to match. Put together a TNT2 Ultra processor, 32MB of SDRAM and a 300MHz RAMDAC and you have a card that can easily handle 1,024x786 32bit colour with a refresh rate up to 170Hz, and when pushed up to 1,600x1200 32bit colour it can still maintain a respectable 85Hz.

In the box you'll find an MPEG-2 player, a copy of Psygnosis' Rollcage and Rage's Expendable, as well as Sonnetech's Colorific and 3Deep colour and screen optimisation tools. For those who want to enjoy gaming on a big-screen TV there is also an S-Video TV out-port, complete with a composite converter cable.

Unfortunately you don't get the future proofing of AGP 4x, but you do get a card that will still take some time to show its age.



On OpenGL performance it was consistently near the top of the group with a similar story in Direct3D. It may not be quite as fast as the Asus and Guillemot, but considering the price it's worth a look.

PCW DETAILS

★★★★

Price *£151.58 (£129 ex VAT)*
Contact *Dabs Direct 0800 138 5142*
www.creative.com
Good points *Good 3D performance and TV out*
Bad points *No AGP 4x support*
Conclusion *Good performance for the price*

Creative **3D Blaster Savage4**

Creative's Savage4 is an entry-level budget option. While the Savage4 can't really compete with the other cards in the test, for just under £70 including VAT you wouldn't expect it to. Creative has opted for S3's Savage4 Pro along with 32MB of SDRAM and a 300MHz RAMDAC. As with the more expensive TNT2 Ultra Creative card, you'll find Sonnetech's Colorific and 3Deep optimisation software to help adjust the colour and display more accurately, but not the bundled games.

In terms of performance, the Creative Savage4 came last in all of the 16bit colour Direct3D and OpenGL tests. Moving onto 32bit colour did not improve matters, with only those cards unable to perform in that colour depth doing worse.

If you're into gaming, then you'll only be disappointed by this card, but as it is the cheapest in the tests you can't really expect tremendous performance. If you're not that interested in 32bit colour 3D then you could have a Voodoo3 2000 for £10 more. And even if you do want 32bit colour 3D, considering its poor frame rates, this isn't the card to choose.

PCW DETAILS

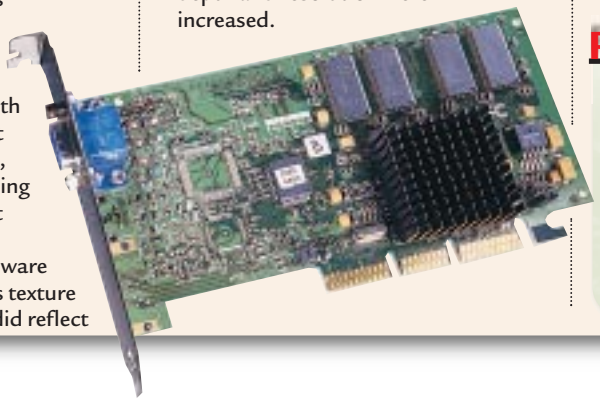
★

Price *£69.33 (£59 ex VAT)*
Contact *Dabs Direct 0800 138 5142*
www.creative.com
Good points *A cheap 3D option*
Bad points *Doesn't really cut it when compared with the competition*
Conclusion *You're better off spending £10 more on the Voodoo3 2000*

Diamond **Stealth III S540**

The Stealth III S540 is Diamond's budget option utilising the Savage4 Pro+ chipset from S3, the company which recently merged with Diamond. The card features 32MB of SDRAM, a 300MHz RAMDAC and AGP 4x capability, which is selected by changing a few jumpers on the card. The card offers performance in keeping with its price range – it does not excel at 2D or 3D graphics, but you can't expect lightning performance in the budget arena.

The Stealth offers hardware DVD acceleration and S3's texture compression. The results did reflect the card's price, but it still managed to score 1,213 3DMarks when faced with 1,280 x 1,024 in 32bit colour. Quake III tests showed a playable 31.6fps at 1,024x768 in 16bit colour, but this fell significantly as the colour depth and resolution were increased.



The Stealth is a basic no-nonsense card without all the bells and whistles seen on the more expensive models, but the Voodoo3 2000 offers better performance if you're happy with 16bit colour.

PCW DETAILS

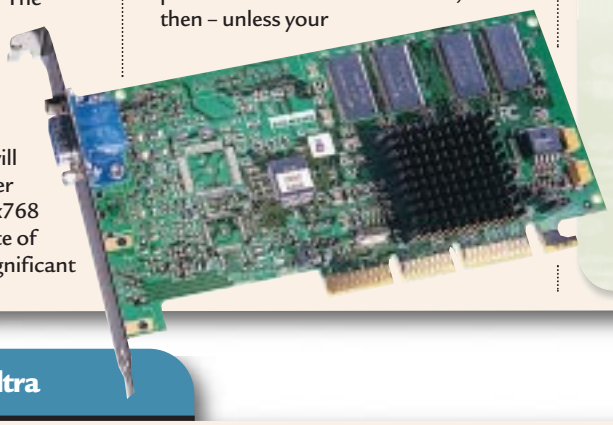
★★

Price *£92.83 (£79 ex VAT)*
Contact *Dabs Direct 0800 138 5142*
www.diamondmm.com
Good points *AGP 4x future proofing*
Bad points *Not up to serious gaming*
Conclusion *If you're on a budget the Voodoo3 2000 is a better bet*

Diamond **Stealth III S540 Xtreme**

The Stealth III S540 Xtreme is the latest addition to the S540 family and should be available in the shops by the time you read this. The Xtreme has all the features of the normal model (AGP 4x, 32MB of SDRAM, 300MHz RAMDAC) but everything clocks in that little bit higher. The speed hasn't been upped so much that a fan is necessary to stop things melting, but there is a noticeable performance increase.

Your extra £10 (ex VAT)will buy you eight more frames per second in Quake III at 1,024x768 16bit, resulting in a frame rate of 39.4. Direct3D also sees a significant increase, with the Xtreme scoring 3,805 3DMarks compared to 3,036 for the basic model. You'll not find anything more in the box than the standard model, but considering the price difference you wouldn't expect to. If you've already decided to purchase a Stealth III S540 card, then – unless your budget is really tight – you may as well opt for the Xtreme version. We saw an increase in all areas except 2D where it scored less, but this isn't likely to affect real-world use to a great extent.



PCW DETAILS

★★★

Price *£104.58 (£89 ex VAT)*
Contact *Simply 0181 498 2100*
www.diamondmm.com
Good points *Good performance increase for the price*
Bad points *Still not one of the faster movers in the group*
Conclusion *It's never going to be a die-hard gamer's number one choice, but the price reflects that*

Diamond **Viper V770 Ultra**

The Viper V770 Ultra, utilising nVidia's Riva TNT2 Ultra chipset, is definitely the over achieving member of the Diamond family – although its future is very much in doubt due to S3's recent acquisition of Diamond. The card packs in 32MB of SDRAM, a 300MHz RAMDAC and an AGP 4x interface.

Its 2D performance saw the Viper sitting in the middle of the group, with a similar situation exhibited as we moved onto Direct3D testing at 16bit colour. Increasing the colour depth to 32bit drew better scores from the card, placing it further up the field. The best results were seen during OpenGL performance, with the Viper consistently sitting within the top five cards.

The Viper aims to provide raw power and doesn't supply extra features, such as additional outputs or TV tuners. In the box you'll find two full games (Superbike World Championship and Wild Metal Country) as well as a software DVD player and Diamond's InControl Tools. On the whole, the Viper offers good performance, but there are better options available in the same price range.

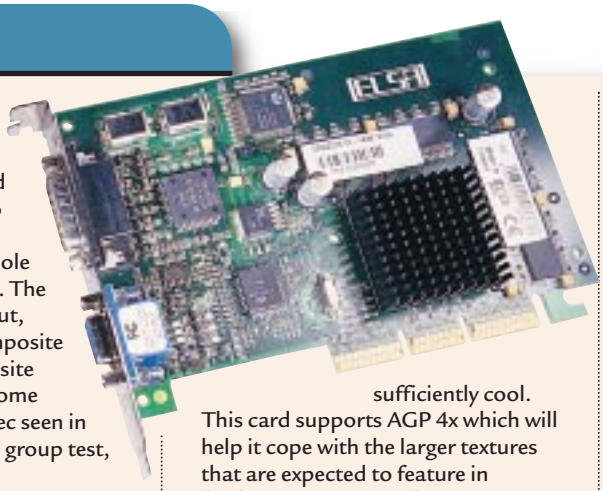
PCW DETAILS

★★★★

Price *£163.33 (£139 ex VAT)*
Contact *Simply 0181 498 2100*
www.diamondmm.com
Good points *Good OpenGL performance*
Bad points *Not many features for the price*
Conclusion *Good if you like Quake and don't care about additional outputs*

Elsa **Erazor III**

This board is a bit of a variation on the TNT2 theme. In addition to the standard features, there is a video out-port to which you attach a cable with a whole host of connectors on it. The cable has one S-Video out, one S-Video in, two composite video in and one composite video out. This is a welcome addition to the basic spec seen in most of the cards in this group test, although it's not cheap.



This card has 32MB RAM with a RAMDAC of 300MHz. There is no fan on the chip, but a large heat sink is attached which should keep it sufficiently cool. This card supports AGP 4x which will help it cope with the larger textures that are expected to feature in forthcoming games. The maximum 2D resolution is 1,920x1,440 in 16bit colour, refreshing at 75Hz.

If you are a fan of gimmicks, you can buy a version of the card that has special glasses to give a 3D effect.

For a standard TNT2 card, it did fairly well in our performance evaluation, finishing slightly above the middle of the table in the majority of the tests.

PCW DETAILS

★★★

Price *£164.99 (£140.42 ex VAT)*
Contact *Force 2 01844 261 872*
www.elsa.com
Good points *Lots of video ports*
Bad points *Not as fast as others here*
Conclusion *A good card with some useful extras*

The Future of Graphics Cards

As graphics cards put pressure on a PCs CPU, Riyad Emeran looks at efforts to take the strain.

The question that used to annoy PC users the world over was: 'Why does a game on a £100 console look better and play faster than a game on a £2,000 PC?' The answer, however, was obvious, – dedicated hardware. The problem with the PC was that it had to be able to handle everything from spreadsheets to arcade games. Consoles, on the other hand, were produced with just one purpose in mind – playing games. So every aspect of the system hardware was configured to this end.

It wasn't long before hardware manufacturers realised that the CPU in a PC alone was not powerful enough to produce the sort of games that users craved, and from this realisation the first batch of 3D graphics cards was born.

Of course there were a lot of teething problems. At first every graphics card manufacturer wanted to promote its own proprietary method of 3D acceleration, which just served to confuse the public. It wasn't until Microsoft managed to iron most of the bugs out of its Direct3D standard that we started to see real movement in 3D graphic acceleration.

However, there was a time when we thought that a good 3D accelerator card could improve the performance of a slow PC. Unfortunately, as the graphics cards have become faster, the need for fast processors to complement them has become increasingly important. Although the latest batch of 3D cards take a huge load off the CPU, they can only process data as fast as the CPU can send it. This means that if a very fast card is coupled with a slower processor, it will sit around twiddling its thumbs waiting for the CPU to send it the geometry information. Also, the fact that the CPU is having to take care of the geometry calculation means that it has less processing power to use on other aspects of the game.

▲THE HIGH POLYGON COUNTS ACHIEVABLE WITH THE GEFORCE 256 ALLOW FOR VERY LIFE-LIKE IMAGES

▼IN FUTURE, DETAILED TEXURES AND COMPLEX LIGHTING ARRANGEMENTS CAN BE HANDLED BY THE GRAPHICS CARD ALONE

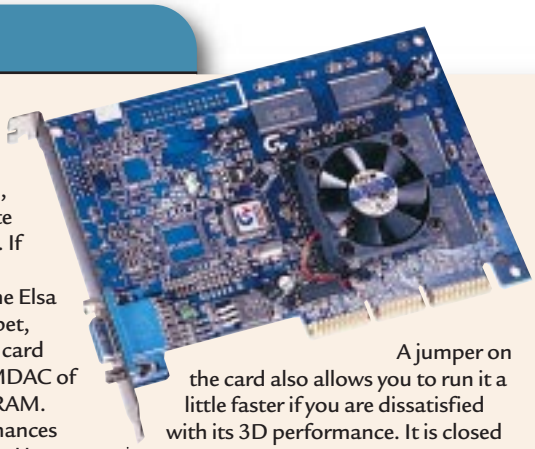
Thankfully this situation is about to change, thanks to the latest graphics chipset from nVidia – the GeForce 256. Cards sporting this new chipset will have the advantage of what nVidia is calling a graphics processing unit or GPU, making the graphics card almost solely responsible for what the user sees on the screen when playing a 3D game.

The GeForce 256 is the first graphics chip to include transform and lighting (T&L) engines in its core design. T&L engines take a huge amount of load away from the CPU since the geometry calculation is performed locally, leaving it free to concentrate on other things. The GeForce 256 also incorporates S3's texture compression, allowing huge textures to be squeezed to a manageable size, improving the image quality without a loss of speed. Strangely, nVidia has chosen not to include hardware environment bump mapping on the chip, leaving the Matrox G400 as the only card supporting this DirectX feature.

It's impressive that nVidia is so far ahead of the competition with the GeForce 256, but as with any piece of hardware, it's only as good as the software that runs on it. Unfortunately, there's no software that supports T&L yet, partly due to the fact that DirectX7 is required. Even the 3DMark benchmarking suite doesn't support T&L yet.

That said, T&L is definitely the future of 3D graphics cards, so don't be surprised if every new card released supports this feature.

Gigabyte **GA-660**



Gigabyte has sent us a fairly basic TNT2 card. It simply has a standard D-SUB connection, with no S-Video or composite ports as seen on other cards. If you're after a multitude of different connectors, then the Elsa Erazor III would be a better bet, although you pay for it. This card has the standard TNT2 RAMDAC of 300MHz along with 32MB RAM.

Gigabyte has taken no chances with the card overheating, and has put a fan on the chip to keep it cool. It will also support newer motherboards with AGP 4x, although there's little advantage in that at the moment.

A jumper on the card also allows you to run it a little faster if you are dissatisfied with its 3D performance. It is closed by default but Gigabyte claims opening it results in a performance increase. You do this at your own risk, though, as the increased heat generated may shorten its life.

However, this may not be necessary as it was the best standard TNT2 in terms of 3D performance, gaining a place it in the upper half of the graphs in most tests.

PCW DETAILS

★★★★

Price *£123.38 (£105 ex VAT)*
Contact *Dabs Direct 0800 138 5142*
www.gigabyte.com.tw
Good points *Decent 3D performance and turbo option*
Bad points *No S-Video or composite connections*
Conclusion *A good value gamers card, but not quite as fully featured as some others*

Guillemot **Maxi Gamer Xentor 32**

HIGHLY COMMENDED Personal COMPUTER WORLD

French company Guillemot has presented us with a card based on the Riva TNT2 Ultra chipset, which nVidia designed with gaming firmly in mind. This particular version of the chip has a RAMDAC of 300MHz, and the 32MB of RAM runs at a fast 183MHz. This gives the chip a good performance boost, putting the card at the top of the table in the lower resolution tests.

A separate fan is present on the chip to help deal with heat dissipation. Unlike some of the other cards, this one only supports AGP 2x, although we saw little improvement with 4x. There is an S-Video port that will enable you to watch DVDs on your television and the Xing DVD player comes packaged in the box – a fair quality player but not quite as good as ATi's. The Maxi Gamer Xentor 32 includes motion compensation and will play DVDs smoothly. A maximum resolution of 2,048 x 1,536 with 65,000 colours at 60Hz is possible in 2D, although the Matrox G400 Max can achieve this resolution in 16.7m colours at 85Hz. Overall a card with whopping 3D performance, but not quite as fully featured as the Matrox G400 Max.

PCW DETAILS

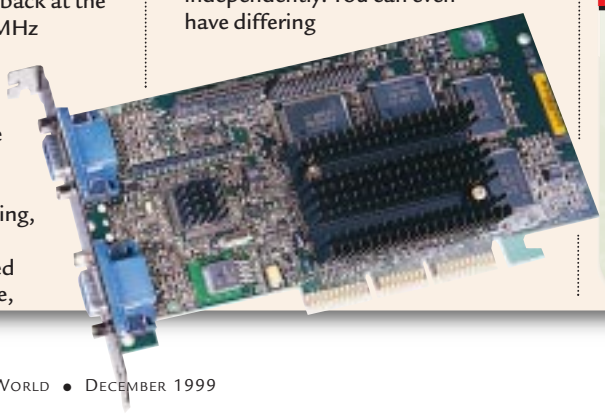
★★★★

Price *£186.83 (£159 ex VAT)*
Contact *Guillemot 0181 686 5600*
www.guillemot.com
Good points *Good 3D performance, S-video port*
Bad points *No AGP 4x support*
Conclusion *A good all-rounder, well worth buying but not quite as good as the Matrox*

Matrox **Millennium G400**

Matrox changed the face of graphics card technology when it released the original Millennium card. Since then we've seen the Millennium II, the Millennium G200 and now the Millennium G400. This latest card has definitely put Matrox back at the cutting edge. With a 300MHz RAMDAC and 32MB of SGRAM the G400 has quite a formidable specification. It is also the first graphics chip to incorporate hardware environment bump mapping, for impressive 3D environments with reduced polygon counts. Of course, games have to be specifically coded to take advantage of this feature, but Matrox assured us that there is a lot of software already in the pipeline.

Another unique feature is the dual-head capability. This allows the card to drive two monitors independently. You can even have differing refresh rates on each of the displays.



Performance is good, but not as good as its big brother the G400 Max. That said, you're not likely to be disappointed with this card and the saving of £30 could be a real issue.

PCW DETAILS

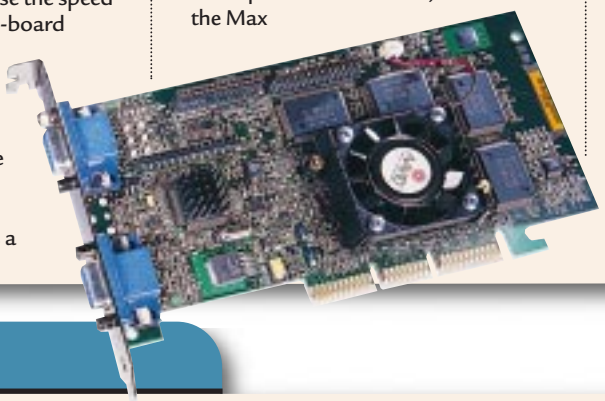
★★★★

Price *£135.12 (£115 ex VAT)*
Contact *Dabs Direct 0800 138 5142*
www.matrox.com/mga
Good points *Good features/price ratio*
Bad points *Not quite as fast as its big brother*
Conclusion *A great all-round card, definitely worth considering*

Matrox **Millennium G400 Max**

Matrox has taken its G400 chipset to a new level with the Millennium G400 Max. Although it shares much of the architecture with the standard Millennium G400, its performance scores show that it's a much faster card. It's hard to tell what's been improved on the Max, since Matrox won't disclose the speed of the processor or the on-board memory. However, the fact that the Max has a fan to cool the heatsink and the standard G400 doesn't, indicates that the processor is running significantly faster.
The other improvement is a faster RAMDAC, running at 360MHz instead of 300MHz. This allows the Max to maintain a steady 85Hz refresh rate at the ludicrously high resolution of 2,048 x 1,536.
The Max also shares the dual head technology of the standard G400, making it very versatile.

In performance terms, the Max produced excellent results, topping the chart in the 2D SYSmark test. 3D performance was also first rate, especially at high colour depths. But it's not just about raw power, the G400 Max also has a great feature set and a strong pedigree.



PCW DETAILS

★★★★★

Price *£170.37 (£145 ex VAT)*
Contact *Dabs Direct 0800 138 5142*
www.matrox.com
Good points *Fast and feature packed*
Bad points *None to speak of*
Conclusion *The best 2D/3D graphics card you can buy*

Number Nine **SR9**

Number Nine has moved away from using its own chips on its graphics cards and has decided to use the S3 Savage4 Pro chip with a 300MHz RAMDAC for the SR9 32MB card. The card has a maximum resolution of 1,600x1,200 in 32bit colour, which isn't that high by today's standards.

While it's not the worst performer in the tests, the Number Nine card did sit near the back of the pack, managing only 13.1fps running Quake II at 1,600 x 1,200 with 16bit textures. Direct3D performance was a little better, running at 1,280x1,024 in 32bit colour, producing a result of 1,310 3DMarks.

As with Creative's cards, you'll find bundled copies of Sonnetech's Colorific and 3Deep image adjustment tools, and the version we received also featured the optional digital video connector for use with an LCD flat panel display.

The advantage of this connector is that rather than converting a digital signal into an analog one and back again at the LCD panel, the signal is kept digital all the way, providing better quality. As to the question of whether this connector becomes the standard, only time will tell.

PCW DETAILS

★★★

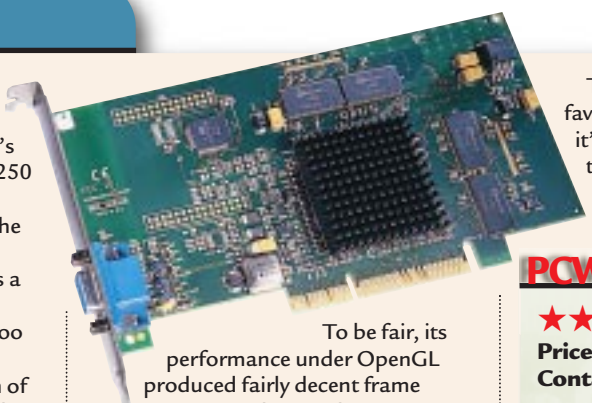
Price *£78.73 (£67 ex VAT)*
Contact *Micro Computer Systems 0181 810 7785*
www.nine.com
Good points *Digital LCD connector*
Bad points *Not the best performer on the block*
Conclusion *The digital connector is a plus, but you'll have to wait for a flat panel that supports it*

VideoLogic **Neon 250**

VideoLogic used to be a force to be reckoned with in the graphics card market, but it's been very quiet of late. The Neon 250 uses the PowerVR 2 chip that's currently seeing a lot of action in the new Sega Dreamcast console.

The original PowerVR chip was a bit of a disappointment and was eclipsed by the original 3dfx Voodoo chipset. Unfortunately for VideoLogic, this latest incarnation of the PowerVR chip hasn't improved the situation.

The card has 32MB of SDRAM and a 250MHz RAMDAC. The latter is a little disappointing since most of the competition runs at a minimum of 300MHz.



To be fair, its performance under OpenGL produced fairly decent frame rates in Quake II and III running at 1,024 x 768. However, the Direct3D performance was a different story, with the Neon languishing at the bottom of the 3DMark tables along with cards that are over a year old.

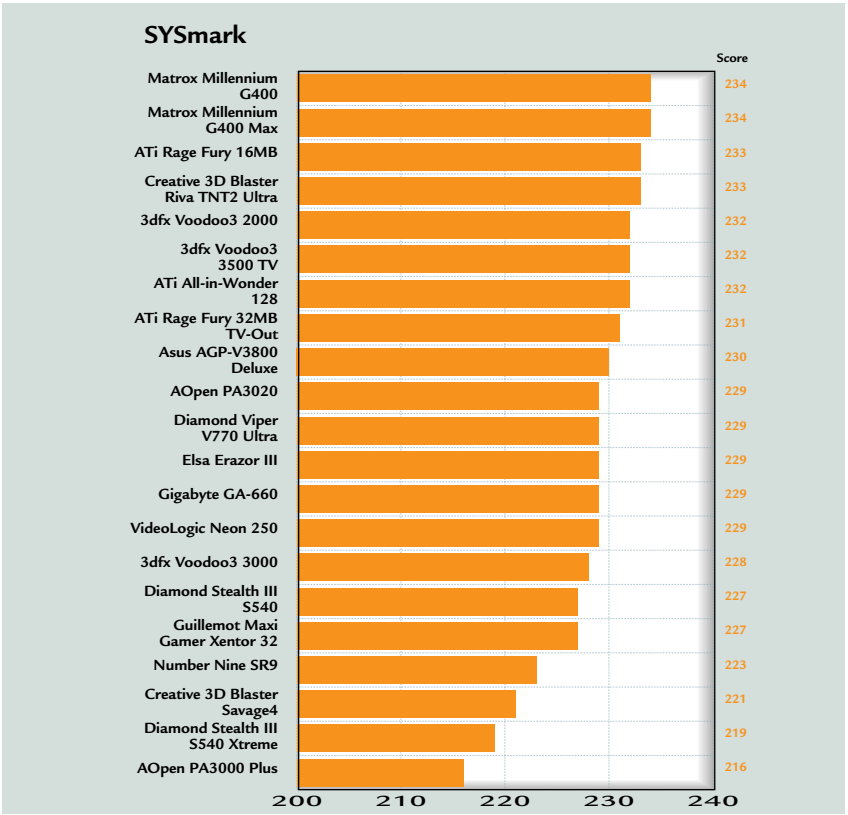
The only point in the Neon's favour is its price, at £99 ex VAT it's one of the cheaper cards on test, but for £15 more you could have a Matrox G400, and the difference is worth it.

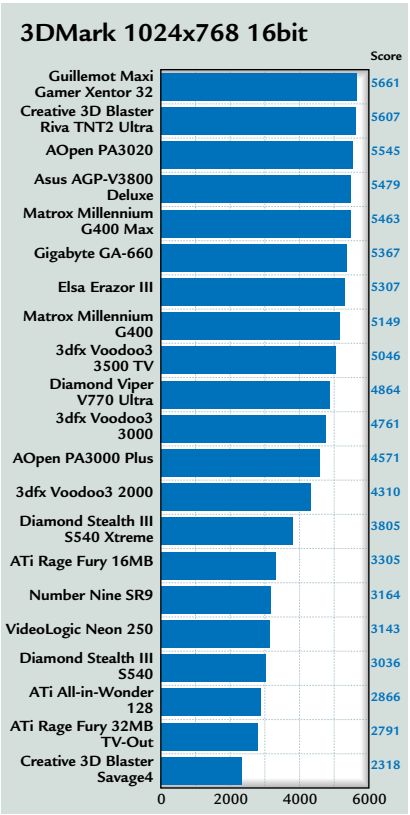
PCW DETAILS

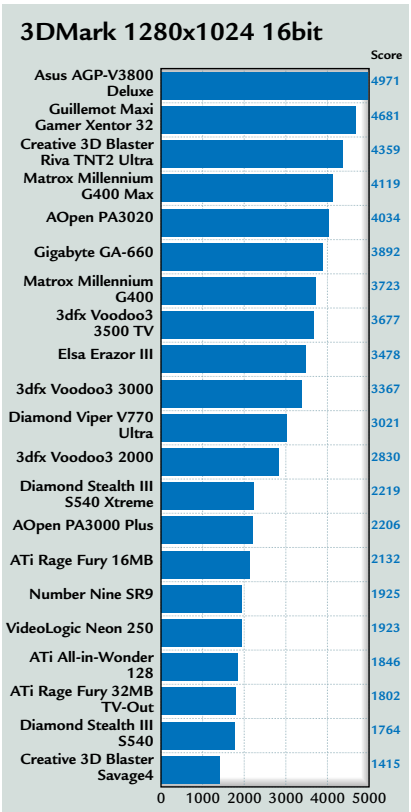
★★

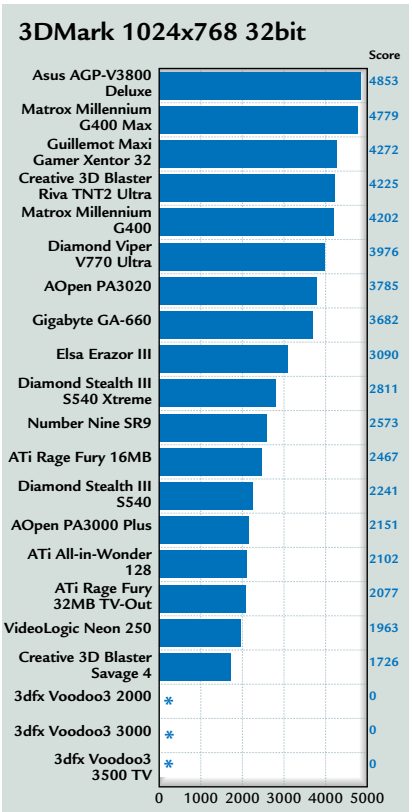
Price *£116.32 (£99 ex VAT)*
Contact *Dabs Direct 0800 138 5142*
www.videologic.com
Good points *Relatively cheap*
Bad points *Very poor Direct3D performance*
Conclusion *Fairly affordable, but the Neon can't match the competition*

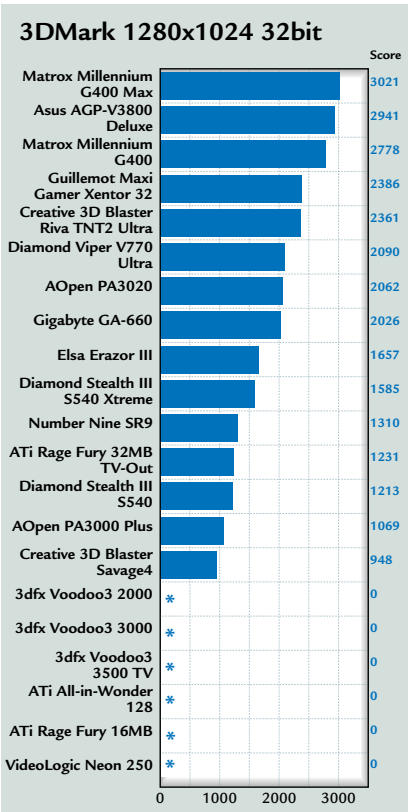
PCW Labs Report







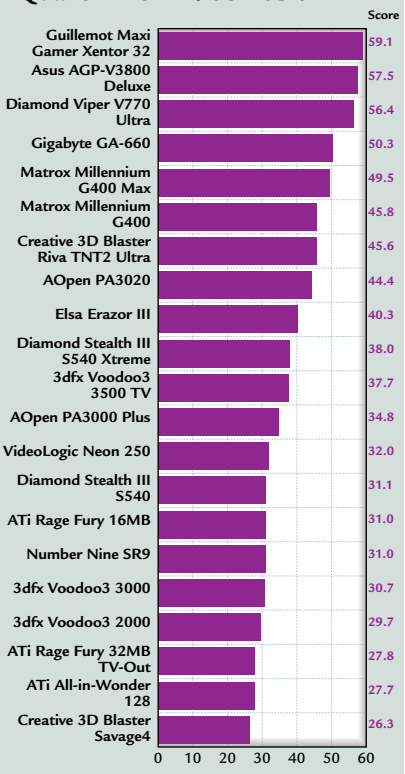




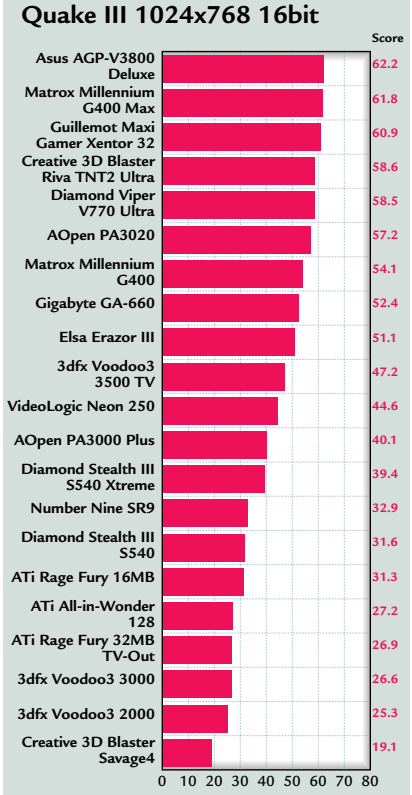
PCW Labs Report

All scores in frames per second.
* Would not run test

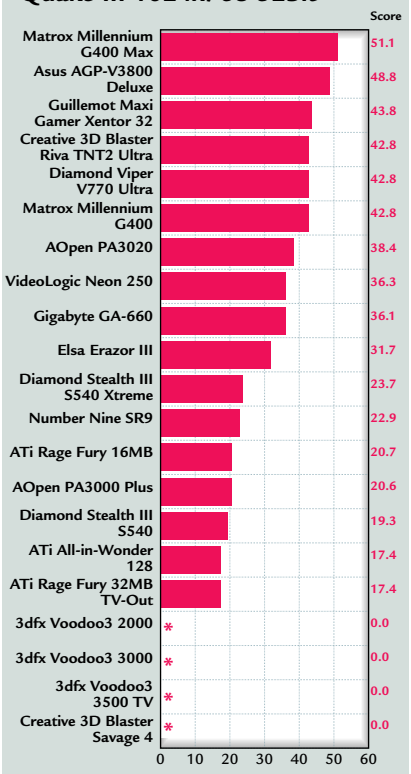
Quake II 1024x768 16bit



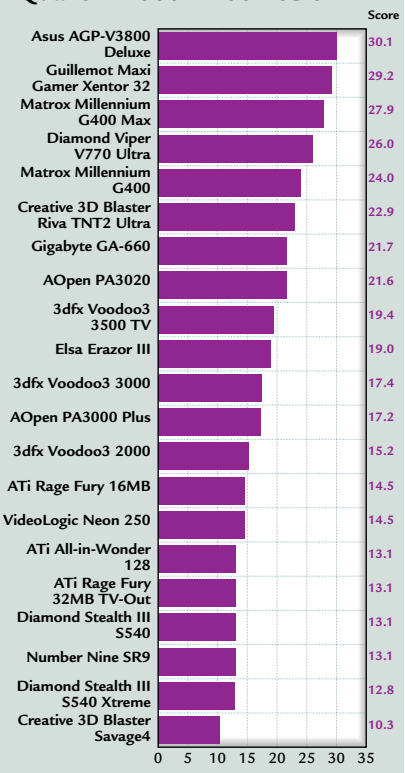
Quake III 1024x768 16bit



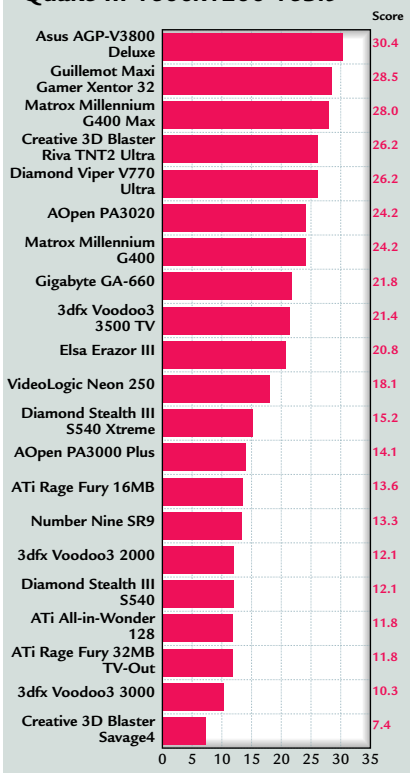
Quake III 1024x768 32bit



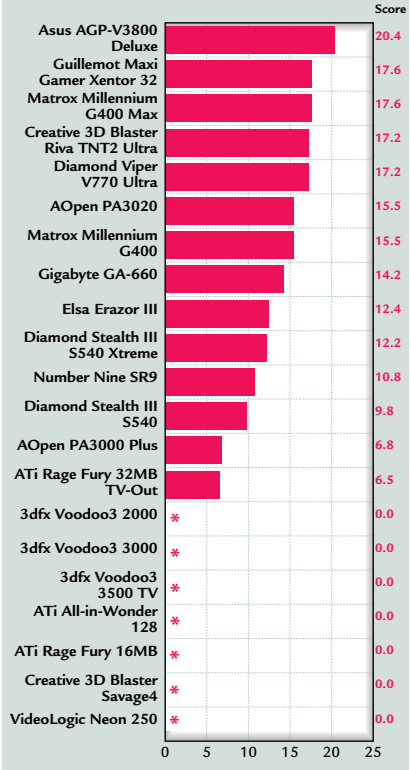
Quake II 1600x1200 16bit



Quake III 1600x1200 16bit



Quake III 1600x1200 32bit



How we did the tests

It's hard work putting graphics cards through their paces. Another round of Quake III anyone?

The needs of every user are different and this makes it very difficult to put together a comprehensive benchmark test. Some may place more emphasis on 2D performance – with the ability to play a few 3D games a bonus. Others are willing to sacrifice 2D performance to get the best gaming platform possible, at whatever price. Even if this is true, then they may have certain games in mind, which further complicates matters.

▲ THIS TEST HELPS CALCULATE THE CARDS' FRAME RATE BY RUNNING A FUTURISTIC RACING GAME

With these issues in mind, we put together the following combination of tests: SYSmark98, 3DMark99 Max, Quake II crusher demo and Quake III demo 2.

SYSmark98

SYSmark measures the time it takes a PC to perform tasks in 14 common office and content-creation applications. Each test is run three times to ensure consistency. Tests include:
Office Productivity: CorelDraw 8, Excel 97, NatturallySpeaking 2.02, Netscape Communicator 4.05, OmniPage Pro 8.0, Paradox 8, PowerPoint 97 and Word 97.
Content Creation: MetaCreations Bryce 2, Avid Elastic Reality 3.1, Macromedia Extreme 3D 2, Photoshop 4.01, Adobe Premiere 4.2, XingMPEG Encoder 2.1.

In terms of graphics performance, the most difference is likely to be seen by the content-creation applications as opposed to the office productivity programs. The whole test takes a couple of hours to run and at the end an overall score is supplied, with higher numbers meaning better results.

3DMark99 Max

3DMark99 Max is an instruction-set optimised version of 3DMark99 from Futuremark Corporation, which tests the 3D capabilities of PCs. It uses a Real World DirectX 6.1 3D game engine to produce one result from a balanced testing methodology that includes image quality, rendering speed, CPU capability and, depending on hardware support, a test for embossed bump-mapping. For standalone reviews and group tests, we usually perform all tests at 1,024x768 resolution in 16bit colour depth with the test suites set to loop three times. In addition to this, to push the cards that little bit harder we also ran the tests at 1,024x768 32bit colour, 1,280x1,024 16bit colour and 1,280x 1,024 32bit, if those modes were supported by the card. Once again, the higher the score, the better the result.

Quake II

Not one of the newest games around, but it gives a good overview of OpenGL performance. Testing cards with Quake II consists of running a recorded game on the test system and getting a final frames per second (fps) score at the end. The higher the score the better, with an fps of 20 or higher providing visibly smooth playback. There are a number of demos available, and we opted for the crusher demo (available for download from www.voodooextreme.com/3Fingers/files/crusher.zip) which will really put any card through its paces. To run the test, place the file crusher.dm2 in the quake2/baseq2/demos directory.

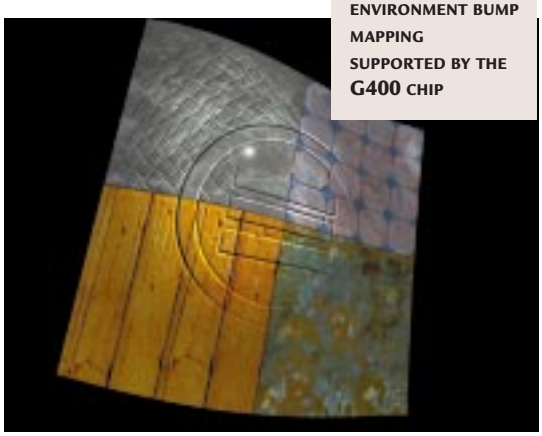
Bring up the console and type:

```
s_initsound 0
snd_restart
timedemo 1
map crusher.dm2
```

We ran the demo at a resolution of 1,024x768 to start with and then also at 1,600x1,200, both with 16bit textures enabled.

Quake III

Quake III has not been released yet, but when it is – it's going to be big. With this in mind, we downloaded the latest Quake III test (version 1.08 available from www.quake3arena.com/q3test/win32.html) and set about testing in a similar manner to Quake II. A couple of demos are already built in to the Quake III test, and we opted for demo 2 which puts a greater demand on the graphics subsystem due to it being staged in an open area with no walls. To run the test you need to bring up the console and enter the following commands:



▼ THIS TESTS EMBOSSED BUMP MAPPING, BUT NOT THE HARDWARE ENVIRONMENT BUMP MAPPING SUPPORTED BY THE G400 CHIP

```
timedemo 1
demo q3demo2
```

After the demo has finished, bringing up the console again will display the overall fps score. We ran the test four times for each card at 1,024x768 and 1,600x1,200 resolutions in both 16bit and 32bit colour and texture modes. To run the Quake III test successfully, you'll also need a copy of GLSetup, which is available from www.glsetup.com.

Table of features	Voodoo3 2000	Voodoo3 3000	Voodoo3 3500 TV	PA3000 Plus	PA3020	AGP-V3800 Deluxe	All-in-Wonder 128	Rage Fury 16MB	Rage Fury 32MB TV-Out	3D Blaster Riva TNT2 Ultra
Manufacturer	3dfx	3dfx	3dfx	AOpen	Aopen	Asus	ATi	ATi	ATi	Creative
Price inc VAT	£81.07	£104.57	£186.82	£88.13	£175.08	£197.40	£158.63	£72.85	£111.63	£151.58
(ex VAT)	(£69 ex VAT)	(£89 ex VAT)	(£159 ex VAT)	(£75 ex VAT)	(£149 ex VAT)	(£168 ex VAT)	(£135 ex VAT)	(£62 ex VAT)	(£95 ex VAT)	(£129 ex VAT)
Contact	Dabs Direct	Dabs Direct	Dabs Direct	First Hardware	First Hardware	Micro Direct	Dabs Direct	Dabs Direct	Dabs Direct	Dabs Direct
Telphone Number	0800 138 5142	0800 138 5142	0800 138 5142	01296 505101	01296 505101	0161 248 4848	0800 138 5142	0800 138 5142	0800 138 5142	0800 138 5142
Website	www.3dfx.com	www.3dfx.com	www.3dfx.com	www.aopen.nl	www.aopen.nl	www.asus.com	www.ati.com	www.ati.com	www.ati.com	www.creative.com
Essentials										
Chipset	Voodoo3	Voodoo3	Voodoo3	Riva TNT2 64	Riva TNT2 Ultra	Riva TNT2 Ultra	Rage 128	Rage 128	Rage 128	Riva TNT2 Ultra
RAMDAC frequency	300MHz	350MHz	350MHz	300MHz	300MHz	300MHz	250MHz	250MHz	250MHz	300MHz
Interface	AGP	AGP	AGP	AGP	AGP	AGP	AGP	AGP	AGP	AGP
Memory/ Type	16MB/SDRAM	16MB/SDRAM	16MB/SDRAM	32MB/SDRAM	32MB/SGRAM	32MB/SGRAM	16MB/SDRAM	16MB/SDRAM	32MB/SDRAM	32MB/SDRAM
Memory Frequency	143MHz	166MHz	183MHz	125MHz	150MHz	150MHz	103MHz	90MHz	90MHz	182MHz
Hardware MPEG-2 assist	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Software DVD player	✔	✔	✔	✘	✘	✘ (optional)	✔	✔	✔	✔
Composite output	✘	✘	✔	✔	✔	✔	✔	✘	✔	✘
S-Video output	✘	✔	✔	✔	✔	✔	✔	✘	✔	✔
Other	N/A	N/A	TV tuner, audio in/ out, composite in/ out, S-Video in/out	N/A	N/A	S-Video out, composite out, 3D glasses	S-Video in/out, composite in/out, TV tuner	N/A	S-Video out, composite out	N/A
2D refresh rates per resolution (Hz)										
1024x768	120	120	120	150	150	170	180	180	180	170
1152x864	120	120	120	120	120	150	160	160	160	150
1280x1024	100	100	100	100	100	120	125	125	125	150
1600x1200	85	85	85	80	85	85	85	85	85	100
Max res & refresh rate	2046x1536/60	2046x1536/75	2046x1536/75	1920x1200/75	1920x1200/75	2048x1536/60	1920x1200/76	1920x1200/76	1920x1200/76	1920x1440/60
2D maximum colours per resolution										
1024x768	16.7m	16.7m	16.7m	16.7m	16.7m	16.7m	16.7m	16.7m	16.7m	16.7m
1152x864	16.7m	16.7m	16.7m	16.7m	16.7m	16.7m	16.7m	16.7m	16.7m	16.7m
1280x1024	16.7m	16.7m	16.7m	16.7m	16.7m	16.7m	16.7m	16.7m	16.7m	16.7m
1600x1200	16.7m	16.7m	16.7m	16.7m	16.7m	16.7m	16.7m	16.7m	16.7m	16.7m
3D Support										
Alpha blending	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Anisotropic filtering	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Embossed bump mapping	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Hardware environment bump mapping	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Anti-aliasing	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Biliniear filtering	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Trilinear filtering	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Gouraud shading	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Bilinear mip-mapping	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Fogging	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Perspective correction	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Transparency (colour & alpha)	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Z buffering bit depth	16bit	16bit	16bit	24bit	24bit	24bit	32bit	32bit	32bit	24bit
Drivers supplied										
Windows 95/98	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Windows NT	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Direct3D	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
OpenGL	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
GLide	✔	✔	✔	✘	✘	✘	✘	✘	✘	✘

	3D Blaster Savage4	Stealth III S540	Stealth III S540 Xtreme	Viper V770 Ultra	Erazor III	GA-660	Maxi Gamer Xentor 32	Millenium G400	Millenium G400 Max	SR9	Neon 250
	Creative	Diamond	Diamond	Diamond	Elsa	Gigabyte	Guillemot	Matrox	Matrox	Number 9	Videologic
	£69.33 (£59 ex VAT)	£92.83 (£79 ex VAT)	£104.58 (£89 ex VAT)	£163.33 (£139 ex VAT)	£164.99 (£140.42 ex VAT)	£123.38 (£105 ex VAT)	£186.83 (£159 ex VAT)	£135.13 (£115 ex VAT)	£170.38 (£145 ex VAT)	£123.38 (£105 ex VAT)	£116.33 (£99 ex VAT)
	Dabs Direct	Dabs Direct	Simply	Simply	Force2	Dabs Direct	Guillemot	Dabs Direct	Dabs Direct	Microtech	Dabs Direct
	0800 138 5142	0800 138 5142	0181 498 2100	0181 498 2100	01844 261 872	0800 138 5142	0181 686 5600	0800 138 5142	0800 138 5142	0181 810 7785	0800 138 5142
	www.creative.com	www.diamondmm.com	www.diamondmm.com	www.diamondmm.com	www.elsa.com	www.gigabyte.com.tw	www.guillemot.com	www.matrox.com	www.matrox.com	www.nine.com	www.videologic.com
	Savage4 Pro	Savage4 Pro+	Savage4 Xtreme	Riva TNT2 Ultra	Riva TNT2	Riva TNT2	Riva TNT2 Ultra	Matrox G400	Matrox G400	Savage4	Power VRT
	300MHz	300MHz	300MHz	300MHz	300MHz	300MHz	300MHz	300MHz	360MHz	300MHz	250MHz
	AGP	AGP	AGP	AGP	AGP	AGP	AGP	AGP	AGP	AGP	AGP
	32MB/SDRAM	32MB/SDRAM	32MB/SDRAM	32MB/SDRAM	32MB/SDRAM	32MB/SDRAM	32MB/SDRAM	32MB/SGRAM	32MB/SGRAM	32MB/SDRAM	32MB/SDRAM
	125MHz	143MHz	166MHz	183MHz	140MHz	167MHz	183MHz	Not supplied	Not supplied	125MHz	125MHz
	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✘
	✘	✘	✘	✘	✔	✘	✔	✘	✘	✘	✘
	✘	✘	✘	✘	✔	✘	✔	✘	✘	✘	✘
	N/A	N/A	N/A	N/A	S-Video out, composite out	N/A	N/A	Dual head	Dual head	Digital flat panel connector	N/A
	120	120	120	120	200	200	200	160	160	130	120
	100	120	120	120	160	170	150	140	140	85	100
	85	120	120	120	120	150	120	120	120	85	85
	85	85	85	85	90	120	85	100	100	60	60
	1920x1200/60	1920x1440/60	1920x1440/60	2048x1536/60	1920x1440/75	2048x1536/60	2048/1536/60	2048x1536/70	2048x1536/85	1920x1440/60	1920x1440/60
	16.7m	16.7m	16.7m	16.7m	16.7	16.7	16.7m	16.7m	16.7m	16.7m	16.7m
	16.7m	16.7m	16.7m	16.7m	16.7	16.7	16.7m	16.7m	16.7m	16.7m	16.7m
	16.7m	16.7m	16.7m	16.7m	16.7	16.7	16.7m	16.7m	16.7m	16.7m	16.7m
	16.7m	16.7m	16.7m	16.7m	16.7	65K	16.7m	16.7m	16.7m	16.7m	16.7m
	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	✘	✘	✘	✘	✘	✘	✘	✔	✔	✘	✘
	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	32bit	24bit	24bit	32bit	24bit	24bit	24bit	32bit	32bit	32bit	32bit
	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘

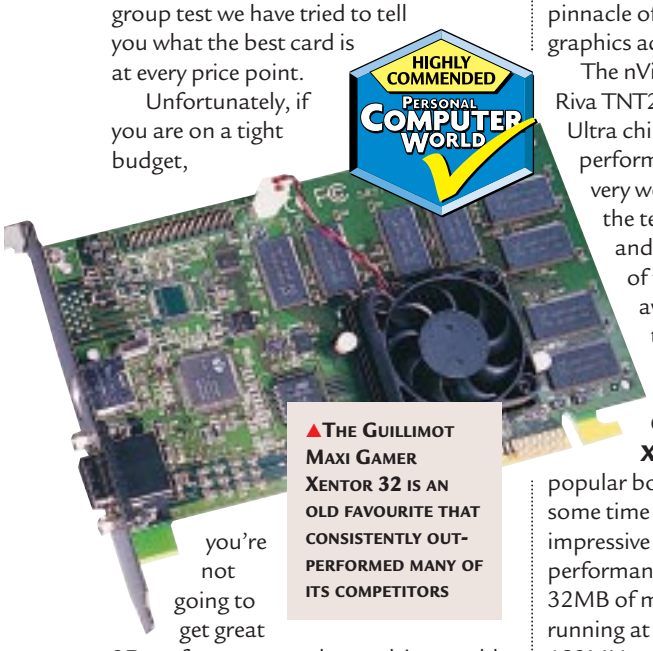
Editor's choice

The graphics card market is frantically expanding, so we help you avoid the wooden spoon brigade.

With a massive 21 cards on test, picking winners wasn't the easiest of tasks, which is why we put each of them through such a rigorous set of tests. The differences between graphics cards in 2D applications is pretty minimal these days, you're not likely to see much differential between any of them in real world use. It's when it comes down to 3D performance that the pack starts to separate, with huge differences in performance between the front runners and the wooden spoon brigade.

As with most purchases you have to ask yourself two very important questions, what do you want to do? and how much do you want to pay? These two questions are equally important, since there's no point deciding you want the best 3D performance available if you only have a budget of £50. Ultimately, you'll have to make a compromise between the two, and throughout this group test we have tried to tell you what the best card is at every price point.

Unfortunately, if you are on a tight budget, you're not going to get great 3D performance, and our advice would be to save up a bit more money before you buy. However, if you're really desperate to play some 3D games and are strapped for cash, the 3dfx Voodoo3 2000 might be worth a look. It wasn't good enough to walk away with an award, but if you're after decent performance at a bargain price it's worth considering.



▲THE GUILLIMOT MAXI GAMER XENTOR 32 IS AN OLD FAVOURITE THAT CONSISTENTLY OUT-PERFORMED MANY OF ITS COMPETITORS

Demonstrating a stunning return to form, Matrox has grabbed the Editor's Choice award. The Millennium G400 Max has a formidable array of features including a dual-head facility for supporting two monitors simultaneously. There's 32Mb of on-board memory and a ridiculously-high 360MHz RAMDAC, making sure that a flicker-free refresh rate is achievable, no matter what the resolution. Performance is superb in both 2D and 3D environments and the G400 chipset is the only one to support hardware environment bump mapping. If you're looking for the pinnacle of PC graphics acceleration, this is it.

The nVidia Riva TNT2 Ultra chipset performed very well in the tests, and both of the highly commended awards go to boards based on this chip.

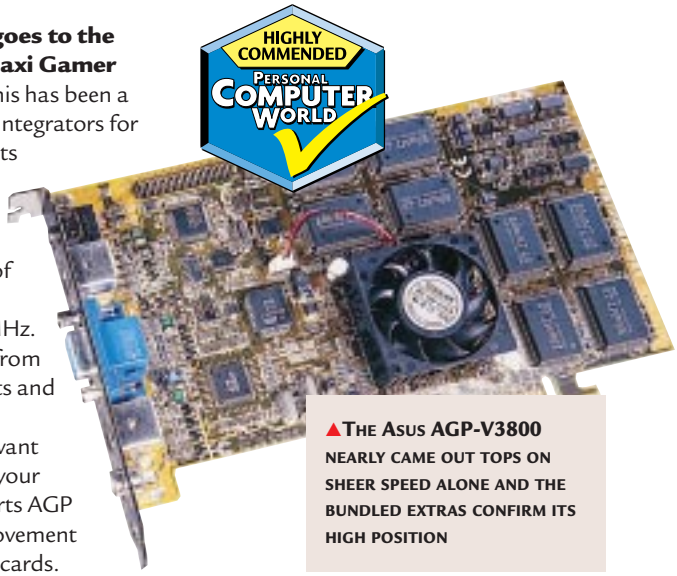
If you're looking for the pinnacle of PC graphics acceleration, this is it

The first goes to the Guillimot Maxi Gamer Xentor 32. This has been a popular board with PC integrators for some time now, due to its impressive performance. There's 32MB of memory running at a frequency of 183MHz, while the RAMDAC runs at 300MHz. This card was never far from the top in any of the tests and it also has a TV-out connector, in case you want to play DVD movies on your television. It only supports AGP 2x, but we saw no improvement using AGP 4x-equipped cards.

▲THE MATROX MILLENNIUM G400 MAX CONTAINS THE G400 CHIPSET, WHICH IS THE ONLY ONE TO SUPPORT HARDWARE ENVIRONMENT BUMPING

The second Highly Commended award goes to Asus for its AGP-V3800 deluxe. Again putting the TNT2 Ultra to good use, this card is very fast. It also has S-Video and composite video outputs. Asus has even supplied the cables for both video out ports. To round things off there's a pair of 3D glasses, compatible with two bundled games. They may not be to everyone's taste, but they add value to an already good package.

Finally we'd like to thank Carrera, Panrix and Polar for supplying us with the equipment needed to perform this group test.



▲THE ASUS AGP-V3800 NEARLY CAME OUT TOPS ON SHEER SPEED ALONE AND THE BUNDLED EXTRAS CONFIRM ITS HIGH POSITION

Spinning your web

These days everyone who's anyone has a website, from showing off their baby pics to selling goods around the world. Nik Rawlinson tests the software available to help you build your own.

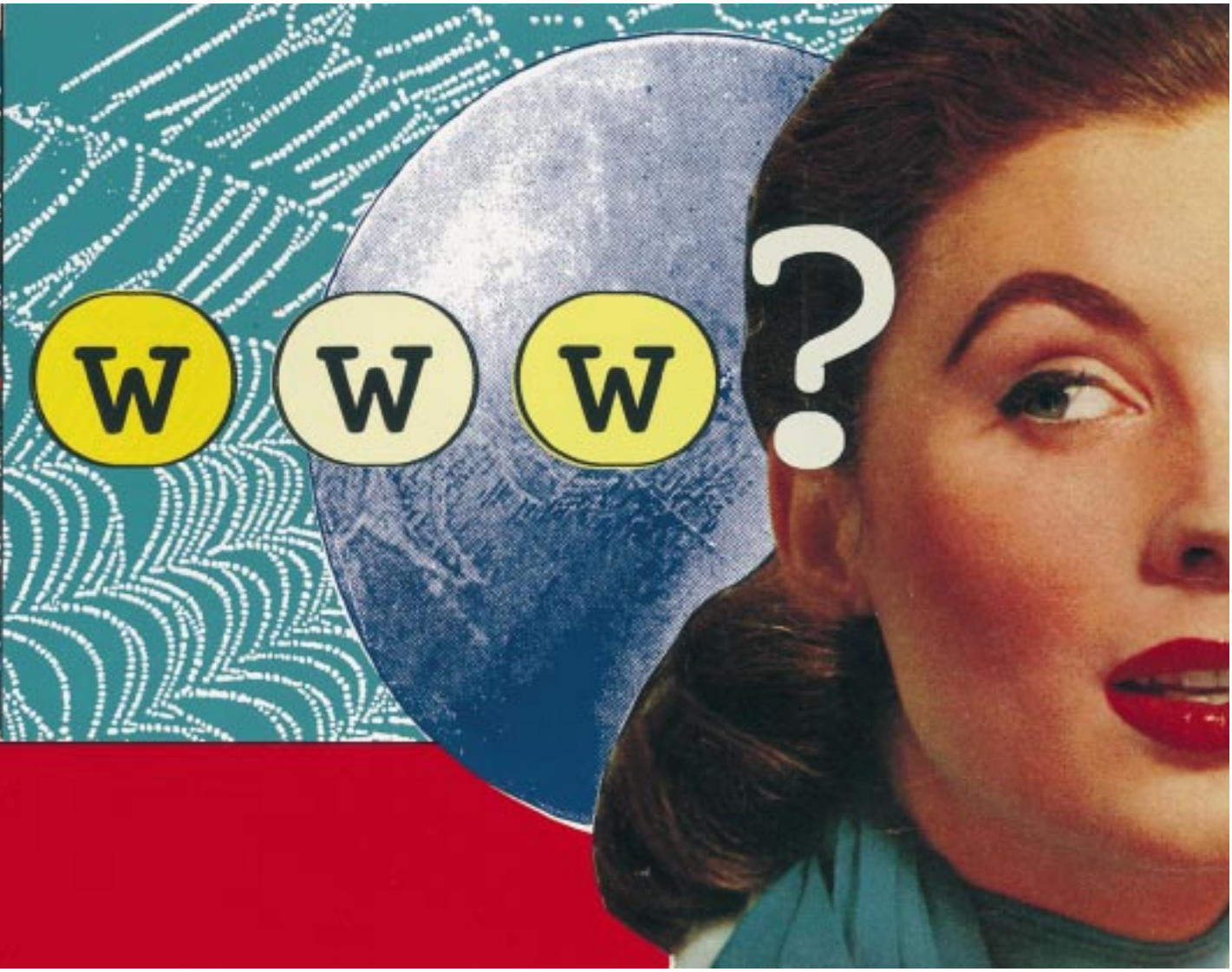


ILLUSTRATION MAT HEARING

With the recent burst of free ISPs, it's more important than ever for businesses and some home users to have a credible presence on the net. It won't be long before businesses without websites are like shops without storefronts, and while home pages used to be a novelty, they're rapidly becoming the norm for thousands of home users nationwide.

Probably the only businesses that won't be glad to hear that it's no longer necessary to hire a web design consultancy are the consultancies themselves. A plethora of WYSIWYG packages are filling the market, and with every day that passes the choice becomes more difficult to make. Bearing that in mind, we have split the products reviewed here into two categories, defined by their target users. First, we look at the heavier business packages, then we move on to small-office and home-user options.

Of course, that's not to say the home user will be unable to use high-end packages and vice versa, but the cost implications of database integration, chat forum wizards and suchlike often puts them out of their reach. Likewise, large organisations may be able to make good use of the home and small-office applications.

We also take a look at perhaps the most important aspect of your online identity – a memorable web address. Without an easily remembered URL, your site could soon become an online wilderness. What you need is a domain of your own. We lift the lid on these new-age designer labels and tell you how to get your own.

The important question to ask is whether you would rather shop online with an organisation that has a domain of its own or one whose web address includes the name of a free ISP.

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Claris HomePage 3
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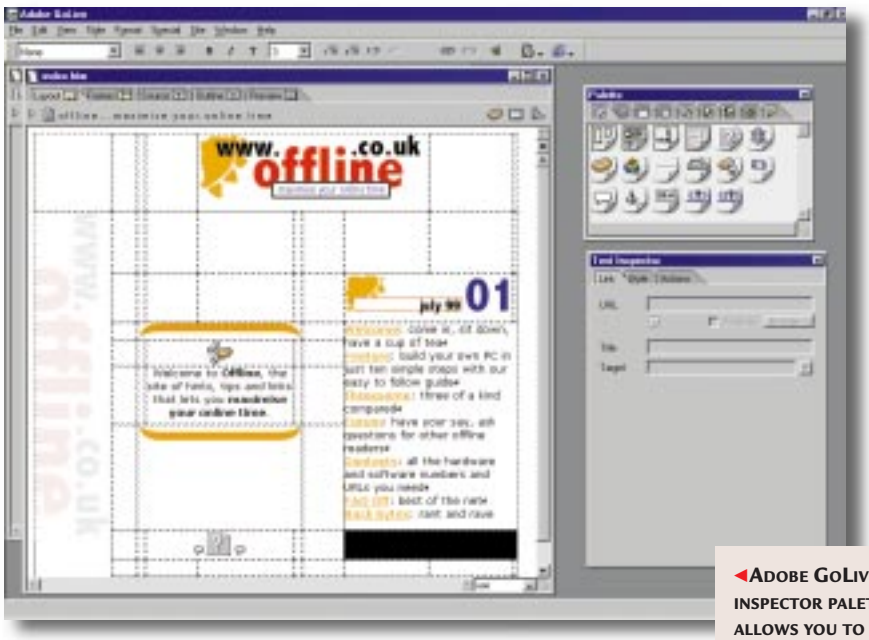
Ratings

★★★★★ **Highly recommended**
★★★★ **Great buy**
★★★ **Good buy**
★★ **Shop around**
★ **Not recommended**

High-end **business users**

Websites now serve as the shop window for businesses, so choosing the right package is vital.



◀ADOBE GOLIVE'S INSPECTOR PALETTE ALLOWS YOU TO MAKE CHANGES IN A SINGLE LOCATION

Business users are perhaps the most demanding group of web authors. They require reliable code with good cross-browser compatibility, to ensure that none of their customers will have trouble accessing their online presence. They also frequently require more complex functions, such as database integration, discussion forums and the ability to edit sites from more than one geographic location. These sorts of functions don't come cheap, so while they may come in useful for the smaller business user or high-end home author, they are usually restricted to this business-oriented market.

Adobe GoLive 4

Familiar to Mac users as GoLive CyberStudio, this industry leader has not benefited from its transition to the PC platform. It has a clean, uncluttered interface but does not enjoy the award-winning Adobe interface of Photoshop, Illustrator and InDesign.

Entire sites can be imported from the hard drive or by FTP, so it is easy to work on an evolving presence from multiple geographic locations. QuickTime editing functions are also included, and you can add effects to the QuickTime filters track. You can also add an HREF track so that links within a movie will auto-load within a browser frame when the movie reaches a certain point. If you're thinking of making an online training video, this is an indispensable feature.

An externally referenced JavaScript library means you will not find yourself opening every page with a particular JavaScript element to make a change – just change it once within the library copy and the change will ripple down through every page where it is used.

We found that when previewing some table-based pages, GoLive disregarded table width tags, fouling up our layout. However, it had no problem displaying the same page correctly in layout mode.

The Inspector palette, similar to the one in Macromedia Dreamweaver, allows you to make changes in a single screen location, rather than having to hunt around for variable boxes.

Perhaps the most serious flaw in GoLive lies in its frame-handling abilities. For a start, you can't apply frames within the layout mode – you have to be in the exclusive frame mode. Second, if you drag one pre-defined frameset into another, it seems to invoke another random and contrary split to the frame into which you are dragging, and applies your new frameset to just one of the two new frames. It's then up to you to manually destroy the surplus frame. However, the Undo function doesn't apply to frames, so one wrong move and you'll have to start again. The program also has difficulty resizing frames on a percentage basis. Strangely, four frames set to take up 25 per cent of the screen height each will occupy less space than one frame occupying 100 per cent of the screen height.

Table handling is also clumsy. To select multiple cells, they must each be clicked individually. You cannot select a whole column or row, or drag-select across multiple cells. The table inspector has a tab that allows you to alter the attributes of a whole row but not a column. While this makes it easy to create header cells, it does nothing for users who want to make a price list with products left-justified in column one and prices right-justified in column two.

GoLive makes it easy to generate cookies to write to and from the user's PC, and Head Actions can be called at a variety of points within a script rather than just when the page has finished loading. Actions can be initiated on page unloading, for example, by selecting the option from a dropdown menu, which makes it easy to set it to write cookies without any difficult coding. With literally just two clicks, you can have floating alert boxes popping up within your viewer's browser windows.

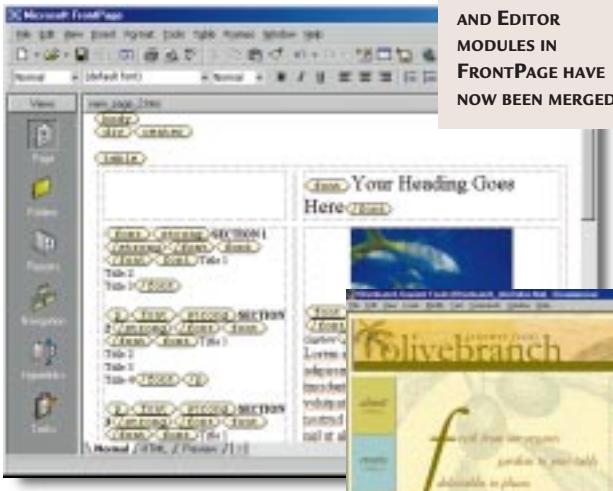
Perhaps the most serious flaw in GoLive lies in its frame-handling abilities

Microsoft FrontPage 2000

FrontPage is difficult to place. On the one hand, it appeals to a home audience because a cut-down version can be downloaded for free and it's bundled with the Premium edition of Office 2000. On the other, its sophisticated extensions and database integration facilities make it ideal for the high-end business user. Web folders make it easy to edit a site located on a remote server

without downloading it to a local drive first, so this is one of the premium packages for maintaining sites from multiple geographical locations.

Users of earlier versions of the package may have found the distinction between the Explorer (site maintenance) and Editor (page design) modules irritating. They have now been merged into a single application, giving the package a more unified and robust feel. Themes are infinitely customisable and all theme elements can be modified to meet users' precise personal needs. The format painter can also be used to 'paint' DHTML attributes from one page element onto another. Many web authors opt to avoid DHTML due to possible browser incompatibility, but FrontPage can substitute any DHTML for equivalent coding that will work in older browsers.



▼ THE EXPLORER AND EDITOR MODULES IN FRONTPAGE HAVE NOW BEEN MERGED

Another change designed to bring traditionalists into the Microsoft fold is the ability to structure HTML to match a sample page that you load. Users of Dreamweaver, therefore, can now use FrontPage and be sure that the HTML will be written using a familiar layout.

Inserting a form area simultaneously dumps Submit and Reset buttons onto the page, so you don't forget them before you save your page. Radio buttons are automatically associated with one another, which saves time when setting up option fields.

The now familiar chat room extension has been supplemented with database extensions for reading and even writing to a server-based database through the browser. This allows you to set up a registration process whereby user details will be automatically written to the database and only registered users can access certain defined areas of your new site.

Microsoft has done much to improve on the clumsy feel of earlier versions and it has largely paid off. The engineers in Redmond could do with taking a second look at Dreamweaver, though, to see how a truly powerful and intuitive web-authoring tool should work.

Macromedia Dreamweaver 2

EDITOR'S CHOICE PERSONAL COMPUTER WORLD

For ease of use alone, Dreamweaver casts a long shadow across every other package here. The attractive interface is clean and uncluttered, although it will seem rather squashed on an 800x600 screen. The pages of every palette are tabbed and can be individually undocked, while the Property Inspector is context-sensitive and will tailor itself to contain attribute fields for whichever page element you have selected. Generating hyperlinks, selecting files and importing images are simple matters of dragging an elasticised pointer from an input box to the relevant file in a directory view. The pointer snaps back, taking the file with it.

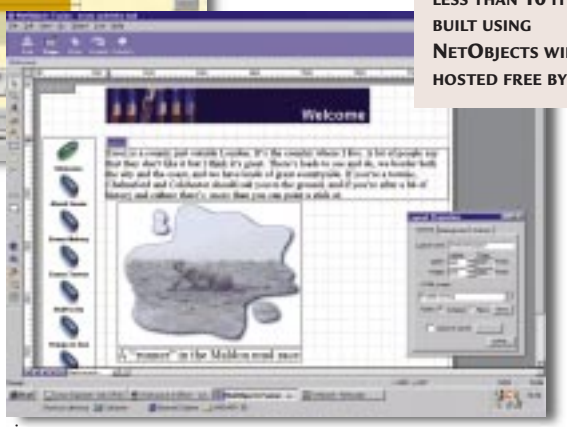
▲ DREAMWEAVER COMES TOP FOR EASE OF USE, WITH ITEMS BEING PLACED USING A POINTER

Pages can be laid out in table or layer mode. Layers will work only in version 4 and above of Netscape Navigator and Internet Explorer, so if you choose to use this more flexible method, Dreamweaver will convert to table layout at the click of a button. To make layers even easier to position, a tracing image can be loaded that will sit behind your workspace, showing through like an onion skin. This is not saved along with your finished page so it will not be seen by your audience.

Dreamweaver's table handling abilities easily outperform those in GoLive. Entire columns can be cut and pasted from one section to another and table data can be sorted, just like a spreadsheet. Styles and fonts are grouped for cross-platform compatibility, so selecting Arial will actually write 'Arial, Helvetica, sans-serif' into your code, to make sure your work looks the same whether your audience is browsing on a PC or Mac.

Pages can be based on user-defined templates. A change made to the template will ripple through all pages based on that template. New templates can be applied to existing pages. They will replace any already in existence and incorporate the existing page content. This allows dramatic changes to be made to multiple pages instantly, such as colour changes that match new corporate identities.

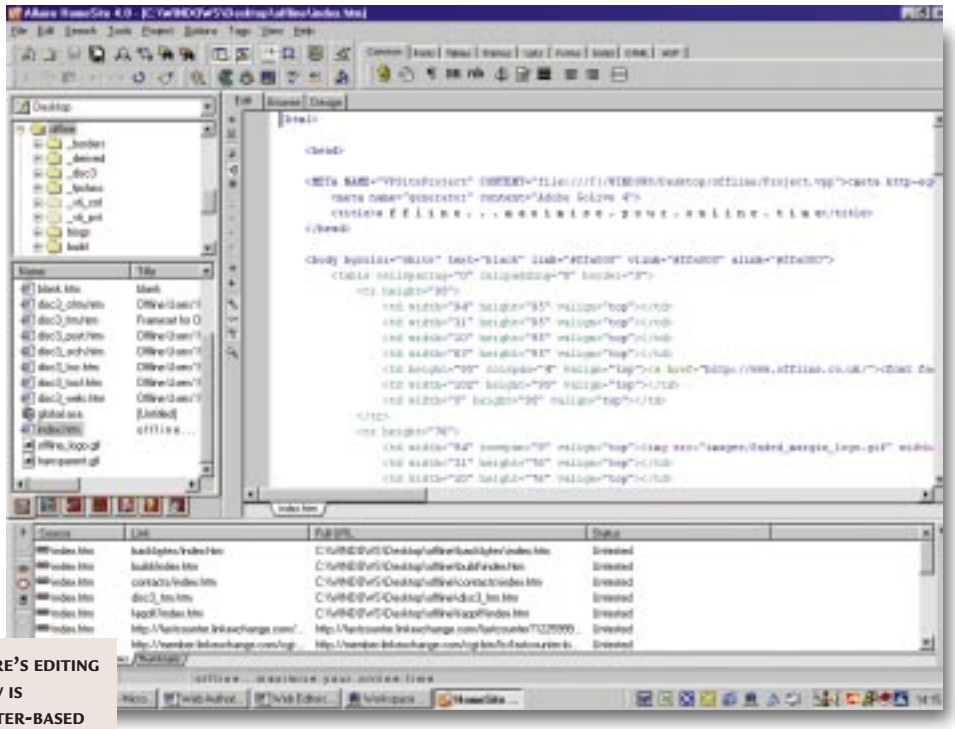
Dreamweaver has no raw code-editing tools, but it comes with a copy of Allaire HomeSite. The two are so closely integrated that seamless HTML round-tripping is the norm, and any changes applied in one package will be applied simultaneously to the code loaded into the other.



▼ A SHOP SELLING LESS THAN 10 ITEMS BUILT USING NETOBJECTS WILL BE HOSTED FREE BY ICAT

NetObjects Fusion 4

For some time, Fusion has been the editor of choice for professional web authors, but the competition is now snapping at its heels. Version 4 uses the same unique picture-handling conventions as its predecessor. Depending on how you handle the frame, a picture will be either stretched



▶ALLAIRE'S EDITING WINDOW IS CHARACTER-BASED BUT THE PROGRAM INCLUDES TOOLBARS

(as is more often the case) or cropped. Users of version 3 will find the interface familiar and easy to use.

Version 4, however, has a wider range of thematic styles. They are far more business-like, quite useable, and even include rollover images so you no longer have to grapple with JavaScript. As ever, Fusion works fast: add a page to your site structure and all other pages will have index graphics added to link to the new page, while banners will be redrawn and customised.

Work in progress is automatically compacted and sites are saved as a whole rather than page by page. Even before you've finished, you have a fully working site so you can preview your work in progress. Generating image maps is also a breeze – simply define a target area and a list of existing pages will pop up, waiting for you to select the appropriate link.

Ecommerce components can be dragged and dropped into the workspace and if your shop has 10 or fewer items on sale, it will be hosted for free by iCat, which will handle all transactions and credit your takings to your own card. You can also incorporate IBM HotMedia components, for a more interactive shop with zoomable images and 3D objects.

Tables are handled well. Cells can be resized by dragging the borders of each cell or the markers that appear in the toolbar, just as in Word. Merging and splitting cells is also easy – just select a number of cells and right-click for the manipulation menu. A spell-check and word count are also welcome features.

Allaire HomeSite 4

HomeSite is aimed at those dedicated users who prefer to code by hand, but will also appeal to visual site designers who want to learn more about editing raw HTML. While the editing window is unashamedly character-based, the interface includes draggable image thumbnails and extensive toolbars that give the feel of a visual editing package. The code-validation module is also thorough, even issuing warnings about use of the Font tag: HomeSite warns that this could become obsolete in the future and that you should consider switching to style sheets.

The snippets palette in Allaire's HomeSite is a real timesaver

The Codesweeper will tidy up your HTML and you can specify the way it handles each of the tags it comes across on an individual basis. All open documents are piled on top of one another and accessed by clicking on tabs at the foot of the main editing window.

The snippets palette is a real time-saver: lines or whole sections of frequently used code can be deposited here and dropped at specific places within your pages with a right-click. It also benefits from multiple levels of undo.

Tables and frames can be generated either on a tags-at-a-time basis, by filling out an attribute form that defines every part of the table or by using the wizards provided. Forms are generated through a series of attribute palettes, because it would not be possible to build a wizard to handle anything so complex. Unfortunately, this means that attributes such as radio buttons are not automatically associated, making this aspect of HomeSite somewhat less user-friendly for inexperienced users. This, however, was our only gripe.

HomeSite 4 features an excellent JavaScript wizard, giving instant, code-free access to a range of scripts for frame-busting, background colour transitions and dropdown URL selection menus.

PCW DETAILS

★★★
Adobe GoLive 4
Price *£229.13 (£195 ex VAT)*
Contact *Adobe 0131 458 6842*
www.adobe.co.uk

★★★★
Microsoft FrontPage 2000
Price *£119 (£101.28 ex VAT)*
Contact *Microsoft 0345 002000*
www.microsoft.com

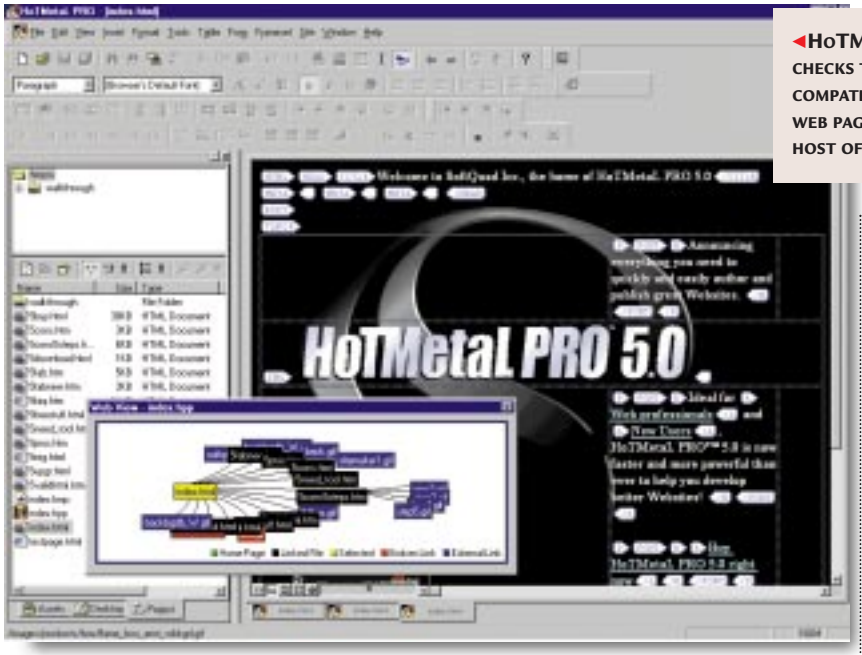
★★★★★
Macromedia Dreamweaver 2
Price *£269.08 (£229 ex VAT), upgrade for £116.33 (£99 ex VAT)*
Contact *Computers Unlimited 0181 358 5857*
www.macromedia.com

★★★★
NetObjects Fusion 4
Price *Full product £233.83 (£199 ex VAT), upgrade £81.08 (£69 ex VAT)*
Contact *NetObjects 01753 705077*
www.netobjects.com

★★★★
Allaire HomeSite 4
Price *£88.13 (£75 ex VAT)*
Contact *Allaire 01638 569600*
www.allaire.com

Home and **small office**

Users with less emphasis on big business still need a web editor to be a good all-round package.



◀HoTMetaL Pro checks to see how compatible your web page is with a host of browsers

Mid-range users are spoilt for choice when it comes to web-authoring software. While they may find home-user packages limiting, there are plenty of alternatives. The software in this section is slightly more friendly than that aimed at large corporate users, while many of those high-end packages in the business category contain features that they will also find useful.

SoftQuad HoTMetaL Pro 5

HoTMetaL's success is largely down to its 'tags-on' view, which mixes a mainly text-based interface with a series of tags that do their best to hide any complicated coding. This serves two purposes. First, it makes the package more attractive to first-time web authors, and second, each tag encompasses a range of properties that can be quickly identified and altered. Tags-on functionality is now incorporated into FrontPage 2000, so if this is your only reason for following the SoftQuad road, consider your options carefully.

HoTMetaL is slow to work with compared to the other packages reviewed here. The Undo function is also slow, because it undoes viewing changes in addition to formatting and typing. So, switching from tags mode to WYSIWYG adds another step to the Undo list, which you have to cycle through even when you have made no physical alteration to your page. We found the WYSIWYG mode difficult to work with, too. Although the tags have been removed from view, they are still present within the document, so it's difficult to know exactly where you are placing your text and you can end up typing on the wrong side of a font tag.

We couldn't get table cell contents to align to the top of a cell, no matter how many times we set the attributes on a whole-table basis through the Attribute Inspector. Another table quirk is the inability to select multiple cells. Formatting therefore has to be applied to the table as a whole, or to each cell on an individual basis. Similarly, HoTMetaL had trouble maintaining cell widths. Although we set our desired width by dragging the cell divider, the software widened cells when we typed long strings rather than wrapping the text. Our formatting was then lost.

Form handling, on the other hand, is excellent: simply select the form element you require from the Forms menu. Radio buttons are automatically linked to build up an alternatives list and generating a dropdown list box is a simple matter of entering your menu options on a form.

HoTMetaL is dictatorial in its loading of existing documents. If they were created outside HoTMetaL, you must agree to every single alteration it wants to make to your existing coding or it will refuse to load it. On a more positive note, it includes spell-checking functions and will even gauge how accessible your page is across a variety of browsers and for users with disabilities. It copes well when importing table data from Excel and has a first-class instruction manual and on-disc reference.

Adobe PageMill 3

If you're an Adobe addict, we'd recommend PageMill above GoLive. Not only is it cheaper, but it has a well-established user base and is a joy to use. The interface is friendly and lets you edit raw HTML. It copes well with importing Excel data and its conversion of Word documents to web pages is second to none. In fact, it did this so well that we had to check the raw HTML before believing it really had performed a translation.

◀PageMill's ability to convert Word documents to HTML was outstanding

Framesets can be generated by splitting the existing screen area or by dragging margins into your workspace with the mouse. This gives you precise control over frame sizes. If you then

create a hyperlink in one of your documents and right-click it, you get a small map of your frameset. You then click the appropriate frame to indicate the link destination. If you want to create a link to your current page on another open window, click on the icon next to your current window's title bar and drag it to the link destination in your other document, and it's done. With no typing or coding, your link is in place.

The Inspector panel is very powerful. Dragging an image onto the Inspector's background square tiles the image as wallpaper, while the pasteboard allows you to drag an image from one page onto the board and then off the board onto another page. This dramatically shortens your working time.

Form creation is similarly well thought out. Once you have a form element on the page, you can CTRL-drag it to another location to copy it. In this way, forms can be generated in seconds and CTRL-dragged radio buttons will automatically be associated with each other, eliminating the need for hand coding or alterations through the Inspector. Field lengths are extended simply by dragging the right-hand border or the element container.

We tried hard, but we couldn't find anything to complain about when it came to PageMill.

▶HOMEPAGE INTEGRATES WELL WITH FILEMAKER, CLARIS' DATABASE OFFERING

Claris HomePage 3

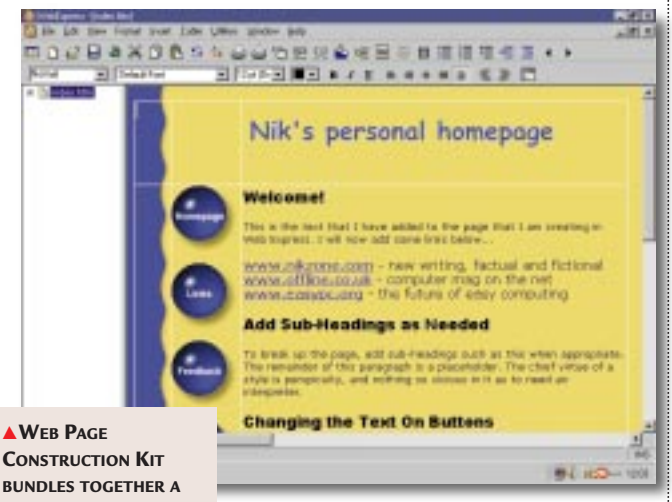
Coming from the home of FileMaker, it's not surprising that HomePage enjoys good integration with this industry-leading database, making it easy to publish dynamically-updated databases on the web. Your pages must be hosted on a server running FileMaker 4, but if you wanted to do the same through FrontPage, you'd need a server with FrontPage extensions.

Tables are handled well and HomePage allows you to select multiple cells by clicking on one corner of your range and then Shift-clicking on the opposite corner. You can merge cells by selecting one and dragging its border into any number of neighbouring cells in any direction at once.

Links are created by highlighting the link keyword and clicking the link editor. You can then type in the hyperlink destination. Although HomePage offers no specific validated link creation like FrontPage, it will check the validity of links internal to the site. It also includes a library of animations, bullets, banners and clip art that can be dragged and dropped into your documents. Images can be easily resized by dragging the corners of the holder frame. Holding Shift at the same time maintains the image proportions.

Frameset creation is straightforward and functional, but by no means as intuitive as the PageMill method. A frames page must be generated from the File menu and the frames it contains can be subdivided from the toolbar or resized by dragging the borders. Unlike PageMill, you cannot edit the pages within your frames – the frame editing page is for editing frames alone. Nor does HomePage name your frames, you are expected to do this yourself from the Object Properties dialog.

Forms are handled well, and radio button sets are automatically associated within a form area. As soon as a form element is added to the page, a Properties dialog box appears so that you can tailor it to your needs. One neat touch is the way that text on a button can be amended simply by clicking on it and retyping.



▲WEB PAGE CONSTRUCTION KIT BUNDLES TOGETHER A LOT OF SOFTWARE, MAKING IT GOOD VALUE FOR MONEY

Web Page Construction Kit 5 Deluxe

This is actually a bundle of three pieces of software and three electronic books, which makes it excellent value for money.

Pages can be created on an individual or site basis and built from scratch or based on a theme. Be warned, though, that basing them on a theme means all the pages in the site will look the same – there is no option to slip in a page that differs. The themes are all fairly generic and although you can make minor modifications, such as the text on your image buttons, it's obvious they've been software generated.

All functions are accessed from the toolbar, which brings up a series of palettes for changing variables, making this a good choice for the first-time user. We were also impressed by the form handling functions. A range of ready-made customisable forms is available for

gathering information, including one that's set up to include a field for credit card details. Another useful form creates a pulldown menu that allows site visitors to jump immediately to a selected page rather than following your site navigation. Assuming your ISP allows you to run your own CGI scripts from its servers, the Construction Kit will write the necessary script and drop it in the appropriate location within your web space to get the form working.

However, you can't view raw HTML directly. To do this, the Construction Kit has to shell out to an external text editor specified by the user during installation. It's not possible to round-trip the code, either, so once amended, it must be reloaded before you'll see the effect.

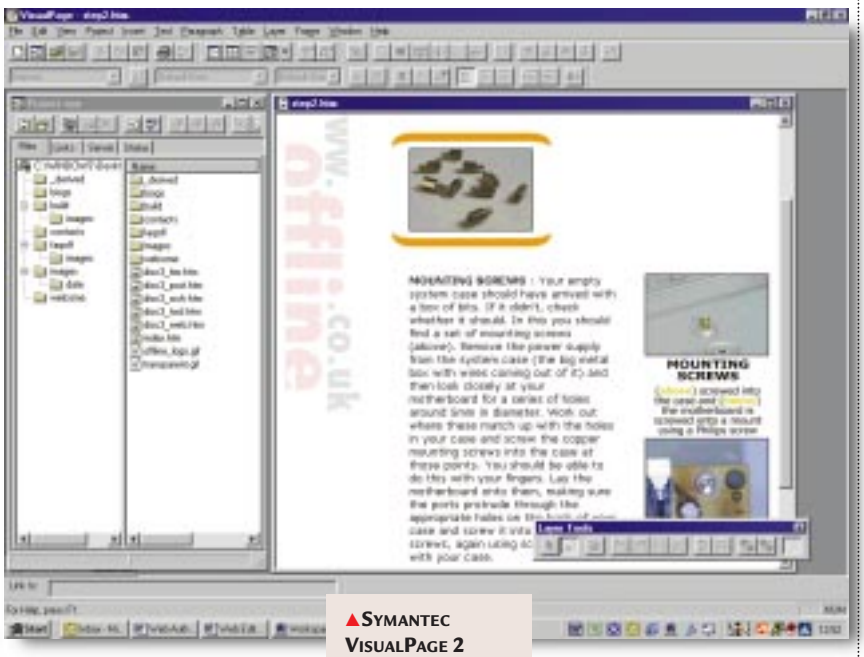
Frames were another minor niggle. They're easy enough to create, but after dropping a page into a frame, we found it difficult to do anything to the frame properties.

Bundled with the package is WebPainter 2, a simple graphics and animation editing kit that will suit most users' basic needs. The interface features a lot of floating workspaces and toolbars, but it makes short work of generating animated gifs and even features onion skinning, where the previous or next frame in your production can be made visible beneath your current workspace to help you line up your frame elements. Packages without onion skinning frequently generate unsteady animations, so from a practical point of view, this is a necessity more than a luxury.

Also included is NEC Auraline, an easy-to-use package for creating presentations that can be used within PowerPoint or, with the inclusion of a small Java applet, a web browser.

Symantec VisualPage 2

The first problem with VisualPage is that if you define a new page based on frames, the program assumes that you want a vertical split with two columns. If not, you have to split one of your columns horizontally before deleting the second vertical frame. A simple question box could have solved this. All frame properties are set in a dialog box, but this does not include a browse button for defining the content – you have to remember this and enter the address yourself.



▲ SYMANTEC VISUALPAGE 2 INCLUDES A LAYER MODE BUT IT IS TIME-CONSUMING

The extensive toolbars are well ordered and allow you to do everything from changing your edit mode to inserting a Java applet with a single click. The raw-code mode is easy to use and if the standard colours used don't suit your needs, they can be changed.

Fonts are arranged in groups, so selecting Arial Group will format your text as Arial, Helvetica for cross-platform compatibility. Changing font sizes is easy: two buttons on the toolbar take care of stepping up and down through the sizes. VisualPage 2 also features a spell checker, but unfortunately only one level of undo.

Creating a table is a matter of filling in a dialog palette. It's not as intuitive as the Word-style table creation of FrontPage, but it is in line with most other packages and does allow you to set every attribute in one hit. One problem that we encountered with tables, though, was its quirky handling of cell merges. We selected a 2x2 square of cells within a large grid and asked VisualPage to merge them into one. On many occasions, it actually merged the two right-hand cells and the two cells to the right of these, leaving the two left-most cells of our initial square untouched.

VisualPage 2 has a layer mode, but it is time-consuming to use. You cannot create layers from scratch, but must first generate your page in standard mode and then transform selected elements to layers so that they can be moved around. We found this more of a hindrance to speedy layout than a help.

Another poorly thought out feature is the new project wizard, which is used to establish new sites. It requires you to specify a site folder but offers no way of creating a new folder, even if you have specified that you are creating a new site from scratch. The only option is to cancel out of the wizard, create the folder through Windows Explorer and start the wizard again.

PCW DETAILS

★★★
SoftQuad HoTMetaL Pro 5
Price *£116.33 (£99 ex VAT)*
Contact *SoftQuad 0181 387 4110*
www.softquad.co.uk

★★★★★
Adobe PageMill 3
Price *£92.83 (£79 ex VAT)*
Contact *Adobe 0131 458 6842*
www.adobe.co.uk

★★★
Claris HomePage 3
Price *£82.24 (£69.99 ex VAT)*
Contact *FileMaker 0845 603 9100*
www.filemaker.co.uk

★★★★
Web Page Construction Kit 5 Deluxe
Price *£49.99 (£42.54 ex VAT)*
Contact *MediaGold 0171 372 9762*
www.mediagold.com

★★★
Symantec VisualPage 2
Price *£62 (£52.77 ex VAT)*
Contact *Symantec 0171 616 5600*
www.symantec.co.uk

Registering a domain

If you're reading this near a radio, flick it on and tune to a commercial station. Don't read any more of this page until you've listened to the next set of adverts...

Done that? Good. So, of the five or six ads you've just heard, how many had phone numbers you remember and could scribble on the top of this page right now? Probably not more than two. So now you can see it's only the simple, easy-remembered numbers that are effective. The same is true of web addresses. It's all very well getting 20MB of free space with your ISP account, but if it has an address as long as a thesis, it'll soon be forgotten and probably ignored.

Sticking with the phone number analogy, if someone has the memorable number you want, there's very little you can do about it. Once it's gone it's gone for good, and if you're not prepared to pay big money you might as well forget it. The same is usually the case with Internet domain names. Unscrupulous users are cashing in on this by cyber-squatting – registering a domain they know someone else will want for the sole purpose of selling it back to them at a higher price later. Although some corporates have taken registrants to court to try to win back the names they see as rightfully theirs, the law is decidedly grey in this area. An attempt has been made to look at the legal history of such cases, and more details can be found at www.patents.com/pubs/jmls.sht.

This piece was written at the beginning of September and on the day it was completed, 10,372,304 domains had been registered worldwide, of which 6,410,871 were .com domains and 372,684 ended with a more homely .co.uk. With the few memorable names that remain going at a rate of several thousand every week, you can see why it's so important to get the name you want before someone else gets there first. In fact, there's a good chance the name you're after has already gone. So, before you finish reading, check out Nominet at www.nic.uk if you're looking for a domain ending .uk or go to www.networksolutions.com for a .com, .net or .org address.

If your name is already registered, we can do nothing but commiserate. You could, of course, try a variant, such as hyphenating, pluralising or adding some extra letters or numbers to your name, but otherwise you're going to have to think of an alternative. Once you've found one you're happy with, it's time to bag it. You could do this directly through the naming authority on one of the two addresses mentioned above, but as it's highly unlikely you'll be a member of either (unless you're very rich), it'll be cheaper to do it through someone who is. For a list of members of Nominet, the UK naming authority, check out www.nic.uk /members.html and follow one of the links. Almost all of these will be able to register a .com, .net or .org address for you too.

As with most things, you would do well to shop around. The cost of .com, .net and .org addresses currently runs to $70 a pop (£48), while .uk addresses have just been reduced to £5 each. Anything on top of that is profit for the agent through which you are registering, so check whether it includes web space and email forwarding. If it doesn't, you may be able to find a better deal elsewhere.

For a more technical overview of the domain registration process, how it works and how it is organised, check out some of the links at http://207.238.20.162/dns.htm.

▲ NETWORK SOLUTIONS DEALS WITH THE REGISTRATION OF ALL .COM, .NET AND .ORG URLS
◀ NOMINET HANDLES REQUESTS FOR ALL WEBSITES ENDING IN .UK

Editor's **Choice**

Ease of use and a good selection of features combine to make the best tools.

Most people have a set idea of how web authoring should be done and fall into one of two camps – text-based or WYSIWYG. For the former, the editor of choice was traditionally Windows Notepad, and if you spend long enough on the net you'll probably even come across some sites with a 'Created with Notepad' button at the foot, boasting the author's talents. The vast majority of users, however, would rather never see a single line of code, and the WYSIWYG editors that form the majority of packages on the market make this possible. Web authoring has advanced further than visual application programming in this respect.

Another important consideration is whether you will need any of the extra features offered by the more expensive authoring tools. NetObjects Fusion 4, for example, is a good buy for users generating ecommerce sites, but may be too expensive and too powerful for a small business or home user. Likewise, Microsoft FrontPage 2000 includes a range of powerful features such as database integration and chat forum wizards, but if you take advantage of these features you are forced to choose a host that supports FrontPage extensions, which is usually a chargeable extra. You'll also be tied to using FrontPage exclusively as its upload protocol is written to interact specifically with servers that have extensions installed.

▲PAGEMILL'S STRENGTH LIES IN IT BEING INCREDIBLY VERSATILE AND EASY TO USE

▲DREAMWEAVER ALLOWS YOU TO GENERATE PRECISELY LAID-OUT PAGES QUICKLY AND EASILY

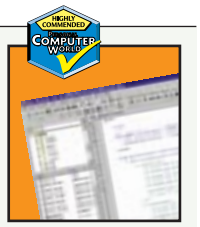
With this in mind, we have picked two products to receive Editor's Choice gongs – one from the high-end business category and the other from the small-business or home-user category. Before we do, however, we award Allaire HomeSite a Highly Commended accolade. This editor now incorporates a WYSIWYG mode, but stays true to its text-based roots to appeal to the extensive base of users who prefer to edit their HTML in the raw. Its authors have worked hard to incorporate many of the features of a visual package, such as toolbars and attribute palettes, without alienating a dedicated audience that has little alternative. Although HoTMetaL tries to bridge the gap between visual and code-based scripting with its tags-on view, we feel that HomeSite's no-nonsense, clutter-free coding window deserves recognition.

The first of our Editor's Choice awards, then, goes home for the second year running with Macromedia for Dreamweaver 2. It may not include some of the features of FrontPage, but it is a far more polished product and is both quicker and easier to use. Dreamweaver works equally well in table and layer mode, allowing you to generate precisely laid-out pages, while in the background it writes clean, well-organised code. Its round-tripping interaction with the bundled Allaire HomeSite lets you look behind the scenes to keep a close eye on your code, while the intuitive, all-encompassing Property Inspector is not matched by any other context-sensitive palette on the market.

Our second Editor's Choice award goes to Adobe, but for PageMill rather than its newer package, GoLive. PageMill has always been easy to use and users who have tried other visual web-authoring tools will not fail to be amazed at just how versatile it is. Put quite simply, if you can imagine doing something in any particular way, you can bet the PageMill authors imagined it too and included that as an option. The getting-started guide is alarmingly slim, but you soon realise Adobe could easily have got away with leaving it out of the box altogether, and besides, there are more than 200 pages of electronic reference on the installation CD.

Users will not fail to be amazed at just how versatile PageMill is

Table of features



Product	GoLive 4	FrontPage 2000	Fusion 4	Dreamweaver 2	HomeSite 4.0
Manufacturer	Adobe	Microsoft	NetObjects	Macromedia	Allaire
Price (inc VAT)	£229.13	£119	£233.83	£269.08	£88.13
Price (ex VAT)	£195	£101.28	£199	£229	£75
Telephone	0131 458 6842	0345 002000	01753 705077	0181 358 5857	01638 569600
Website	www.adobe.co.uk	www.microsoft.com	www.netobjects.com	www.macromedia.com	www.allaire.com
Frame creation	✓	✓	✓	✓	✓
Form creation	✓	✓	✓	✓	✓
Link Verification	✓	✓	✓	✓	✓
Cascading Syle Sheets	✓	✓	✓	✓	✓
DHTML Tools	✓	✓	✓	✓	✓
Database Integration	✓	✓	✓	✗	✓
Integrated FTP	✓	✓	✓	✓	✓
Bundled Image Software	✗	✓	✗	✗	✗
WYSIWYG interface	✓	✓	✓	✓	✓
Raw code editing	✓	✓	✓	✓	✓
Layer handling	✓	✗	✓	✓	✗
Pre-defined templates	✓	✓	✓	✓	✗
Tags-on view	✓	✓	✗	✗	✓
Edit remote server pages	✗	✓	✗	✗	✗
Publish to any server	✓	✗	✓	✓	✓

Product	HoTMetaL 5.0	PageMill 3	HomePage 3.0	VisualPage 2	Web Page Con. Kit 5
Manufacturer	SoftQuad	Adobe	FileMaker	Symantec	MediaGold
Price (inc VAT)	£116.33	£92.83	£82.24	£62	£49.99
Price (ex VAT)	£99	£79	£69.99	£52.77	£42.54
Telephone	0181 387 4110	0131 458 6842	0845 603 9100	0171 616 5600	0171 372 9762
Website	www.softquad.co.uk	www.adobe.co.uk	www.filemaker.co.uk	www.symantec.co.uk	www.mediagold.com
Frame creation	✓	✓	✓	✓	✓
Form creation	✓	✓	✓	✓	✓
Link Verification	✓	✓	✓	✓	✗
Cascading Syle Sheets	✓	✗	✗	✓	✓
DHTML Tools	✓	✗	✗	✓	✓
Database Integration	✓	✗	✓	✗	✗
Integrated FTP	✓	✓	✓	✓	✓
Bundled Image Software	✓	✓	✗	✗	✓
WYSIWYG interface	✓	✓	✓	✓	✓
Raw code editing	✓	✓	✓	✓	Via shell
Layer handling	✗	✗	✗	✓	✗
Pre-defined templates	✓	✓	✓	✓	✓
Tags-on view	✓	✗	✗	✗	✗
Edit remote server pages	✗	✗	✗	✗	✗
Publish to any server	✓	✓	✓	✓	✓

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If you're reading this near a radio, flick it on and tune to a commercial station. Don't read any more of this page until you've listened to the next set of adverts...

Done that? Good. So, of the five or six ads you've just heard, how many had phone numbers you remember and could scribble on the top of this page right now? Probably not more than two. So now you can see it's only the simple, easily-remembered numbers that are effective. The same is true of web addresses. It's all very well getting 20MB of free space with your ISP account, but if it has an address as long as a thesis, it'll soon be forgotten and probably ignored.

Sticking with the phone number analogy, if someone has the memorable number you want, there's very little you can do about it. Once it's gone it's gone for good, and if you're not prepared to pay big money you might as well forget it. The same is usually the case with Internet domain names. Unscrupulous users are cashing in on this by cyber-squatting – registering a domain they know someone else will want for the sole purpose of selling it back to them at a higher price later. Although some corporates have taken registrants to court to try to win back the names they see as rightfully theirs, the law is decidedly grey in this area. An attempt has been made to look at the legal history of such cases, and more details can be found at www.patents.com/pubs/jmls.sht.

This piece was written at the beginning of September and on the day it was completed, 10,372,304 domains had been registered worldwide, of which 6,410,871 were .com domains and 372,684 ended with a more homely .co.uk. With the few memorable names that remain going at a rate of several thousand every week, you can see why it's so important to get the name you want before someone else gets there first. In fact, there's a good chance the name you're after has already gone. So, before you finish reading, check out Nominet at www.nic.uk if you're looking for a domain ending .uk or go to www.networksolutions.com for a .com, .net or .org address.

If your name is already registered, we can do nothing but commiserate. You could, of course, try a variant, such as hyphenating, pluralising or adding some extra letters or numbers to your name, but otherwise you're going to have to think of an alternative. Once you've found one you're happy with, it's time to bag it. You could do this directly through the naming authority on one of the two addresses mentioned above, but as it's highly unlikely you'll be a member of either (unless you're very rich), it'll be cheaper to do it through someone who is. For a list of members of Nominet, the UK naming authority, check out www.nic.uk /members.html and follow one of the links. Almost all of these will be able to register a .com, .net or .org address for you too.

As with most things, you would do well to shop around. The cost of .com, .net and .org addresses currently runs to $70 a pop (£48), while .uk addresses have just been reduced to £5 each. Anything on top of that is profit for the agent through which you are registering, so check whether it includes web space and email forwarding. If it doesn't, you may be able to find a better deal elsewhere.

For a more technical overview of the domain registration process, how it works and how it is organised, check out some of the links at http://207.238.20.162/dns.htm.

▲ NETWORK SOLUTIONS DEALS WITH THE REGISTRATION OF ALL .COM, .NET AND .ORG URLS
◀ NOMINET HANDLES REQUESTS FOR ALL WEBSITES ENDING IN .UK

Editor's **Choice**

Ease of use and a good selection of features combine to make the best tools.

Most people have a set idea of how web authoring should be done and fall into one of two camps – text-based or WYSIWYG. For the former, the editor of choice was traditionally Windows Notepad, and if you spend long enough on the net you'll probably even come across some sites with a 'Created with Notepad' button at the foot, boasting the author's talents. The vast majority of users, however, would rather never see a single line of code, and the WYSIWYG editors that form the majority of packages on the market make this possible. Web authoring has advanced further than visual application programming in this respect.

Another important consideration is whether you will need any of the extra features offered by the more expensive authoring tools. NetObjects Fusion 4, for example, is a good buy for users generating ecommerce sites, but may be too expensive and too powerful for a small business or home user. Likewise, Microsoft FrontPage 2000 includes a range of powerful features such as database integration and chat forum wizards, but if you take advantage of these features you are forced to choose a host that supports FrontPage extensions, which is usually a chargeable extra. You'll also be tied to using FrontPage exclusively as its upload protocol is written to interact specifically with servers that have extensions installed.

▲PAGEMILL'S STRENGTH LIES IN IT BEING INCREDIBLY VERSATILE AND EASY TO USE

▲DREAMWEAVER ALLOWS YOU TO GENERATE PRECISELY LAID-OUT PAGES QUICKLY AND EASILY

With this in mind, we have picked two products to receive Editor's Choice gongs – one from the high-end business category and the other from the small-business or home-user category. Before we do, however, we award Allaire HomeSite a Highly Commended accolade. This editor now incorporates a WYSIWYG mode, but stays true to its text-based roots to appeal to the extensive base of users who prefer to edit their HTML in the raw. Its authors have worked hard to incorporate many of the features of a visual package, such as toolbars and attribute palettes, without alienating a dedicated audience that has little alternative. Although HoTMetaL tries to bridge the gap between visual and code-based scripting with its tags-on view, we feel that HomeSite's no-nonsense, clutter-free coding window deserves recognition.

The first of our Editor's Choice awards, then, goes home for the second year running with Macromedia for Dreamweaver 2. It may not include some of the features of FrontPage, but it is a far more polished product and is both quicker and easier to use. Dreamweaver works equally well in table and layer mode, allowing you to generate precisely laid-out pages, while in the background it writes clean, well-organised code. Its round-tripping interaction with the bundled Allaire HomeSite lets you look behind the scenes to keep a close eye on your code, while the intuitive, all-encompassing Property Inspector is not matched by any other context-sensitive palette on the market.

Our second Editor's Choice award goes to Adobe, but for PageMill rather than its newer package, GoLive. PageMill has always been easy to use and users who have tried other visual web-authoring tools will not fail to be amazed at just how versatile it is. Put quite simply, if you can imagine doing something in any particular way, you can bet the PageMill authors imagined it too and included that as an option. The getting-started guide is alarmingly slim, but you soon realise Adobe could easily have got away with leaving it out of the box altogether, and besides, there are more than 200 pages of electronic reference on the installation CD.

Users will not fail to be amazed at just how versatile PageMill is

Desktop PCs

Due to the fast-moving nature of the PC industry, we can only recommend particular PCs in the month we have seen them. Prices change almost weekly, as component prices from third-party suppliers fluctuate according to availability. So, for the best current PC buy, for instance, look at our most recent group tests.

It always pays to take a little care when buying a PC or in fact any hardware or software. For *PCW*'s guide to buying direct, see page 293. And don't forget to use the *PCW* Order Form [page 294].

Everyone's ideal PC will have a different mix of components, with gamers needing a very good 3D graphics card, probably a 3D sound card and excellent speakers, while business users will need a good monitor and plenty of RAM.

Entry-level PCs

Budget-conscious buyers might consider a non-Intel processor such as an AMD K6-2 or K6-III. But be aware that if you choose a Socket 7 chip, you'll only be able to upgrade to an AMD processor in future. Most Celerons are only being sold in Socket 370 format rather than in Slot 1 format, so if you get a Socket 370 processor you won't be able to upgrade later to a PIII. Check what processor format you will get when you order. If you are only offered a Socket 370 processor, insist on a Slot 1 board and 'Slocket' combination with 100MHz RAM to maximise the upgrade potential. Look at September's group test for £699 (inc VAT) PCs.

We would recommend the following specification:

- **AMD K6-2 400 or Intel Celeron 400 processor**
- **64MB RAM**
- **6.4GB hard drive**
- **Graphics card with 8MB video RAM**
- **15in monitor**
- **CD-ROM drive, speakers, modem**

Expect to pay around **£599 (ex VAT)** for this configuration, but you may have to pay extra for a sound card, speakers or a modem.

Mid-range PCs

In the mid-range, around **£1,000 (ex VAT)** will get you a good all-round PC. The introduction of higher-speed PIIIs has meant the slower PIIIs have dropped in price, bringing them into this mid-range category. However, the stunning result of the K6-III, and its low price, make it worth serious consideration.

Look for a minimum of:

- **Intel PIII or AMD K6-III 500MHz processor**
- **128MB RAM**
- **12GB hard disk**
- **Good 3D graphics card with 16MB video RAM**
- **17in monitor**
- **DVD-ROM drive**
- **Sound card, speakers, 56K modem**

For business machines that will not break the bank, see this month's PC group test p142.

High-end PCs

If you're after a state-of-the-art machine, be prepared to spend around **£1,500 to £2,000 (ex VAT)**. What you require at this price will be specific to your needs, depending on how you intend to use the machine. However, as a basic specification we would want:

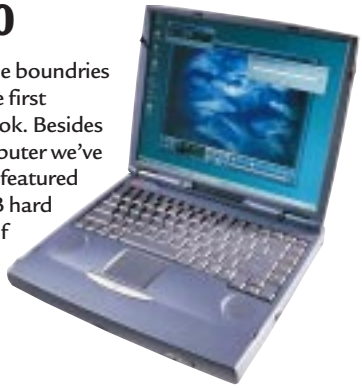
- **PIII 600 or Athlon 600MHz**
- **128MB 100MHz RAM**
- **20GB hard drive**
- **Good 3D graphics card with 32MB video RAM**
- **19in monitor**
- **DVD-ROM drive**
- **Sound card, speakers, 56K modem**
- **Bundled office suite**

For a look at the new Athlon 700, see this month's reviews section.

All product prices are inclusive of VAT and correct at time of going to press

High-end notebook

Hi-Grade **Notino AS7400**



Hi-Grade has pushed back the boundries of mobile computing with the first Pentium III-equipped notebook. Besides being the fastest mobile computer we've ever seen, the AS7400 is fully featured with 160MB of RAM, a 10GB hard disk and a DVD-ROM drive. If you're looking for a high-power desktop replacement, this is it.

➠ *PCW December '99, p73*

Price *£2,113.82* **Contact** *0181 532 6100*
Also Recommended *Dell Inspiron 7000 A366LT (PCW April '99)* **Price** *£1,820.08* **Contact** *0870 152 4850* ◆ *Compaq Armada 7800, (PCW March '99)* **Price** *£3,422* **Contact** *Contact 0181 332 3000*

Mid-range notebook

EDITOR'S CHOICE PERSONAL COMPUTER WORLD

Dell **Inspiron 3500**

The Dell Inspiron 3500, with its Mobile Celeron 366, 64MB of RAM and 4.8GB hard disk is not only well specified, but also has an outstanding build quality. The screen has an even luminescence and vivid colours and it also comes with a very good software bundle.

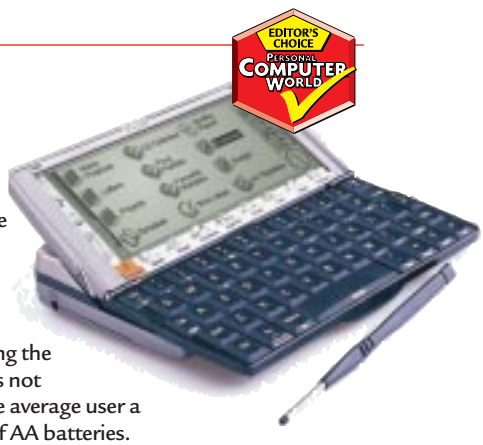
➠ *PCW September '99, p181*

Price *£1,585.08* **Contact** *Dell 0870 152 4850 www.dell.co.uk*
Also Recommended *Esprit Tycoon* **Price** *£1,468.75* **Contact** *Esprit 01670 737888 (PCW September '99)* ◆ *Sharp PC-A150* **Price** *£2,109.13* **Contact** *Sharp 0800 262958 (PCW March '99)*

PDA

EDITOR'S CHOICE PERSONAL COMPUTER WORLD

Psion **Series 5mx**



Retaining the Series 5's good looks, Psion has doubled the memory size and processor speed to 16MB and 37MHz respectively, and built email software into the ROM as well as improving the screen and backlight. It's not greedy, either, lasting the average user a month on a single pair of AA batteries.

➠ *PCW August '99, p92*

Price *£429.99* **Contact** *Psion 0990 143050 www.psion.com* **Also Recommended** *Hewlett Packard Jornada 820* **Price** *£925.78* **Contact** *HP 0990 474747* ◆ *3Com Palm V* **Price** *£349.99* **Contact** *3Com 0800 7311064 (both PCW July '99)*

Colour inkjet

Hewlett-Packard
DeskJet 895CXi

For all-round excellence you can't do better than the HP 895CXi. The quality of its output for both text and graphics is impressive given the swift speed at which they are produced. Even its 'econofast' mode could be used for vital documents, saving both time and ink. It takes a huge range of papers and replacing ink cartridges is a breeze.

PCW October '99, p177

Price £292.58 **Contact** HP 0990 474747 **Also Recommended** Epson Stylus Colour 740 **Price** £299 **Contact** 0800 220546 ◆ Epson Stylus Colour 850 **Price** £239 **Contact** 0800 220546 (both PCW February '99)

Colour photo printer

Epson
Stylus Photo

Easy installation, a five-colour cartridge for photo printing and feature-rich software make this printer an attractive proposition. Its photo reproduction could not be faulted and its job turnaround is impressively fast, too. Black text on photocopy paper was a little disappointing, but the price should suit most pockets.

PCW October '99, p180

Price £239 **Contact** Epson 0800 220 546 www.epson.co.uk Also recommended: Lexmark Z51 **Price** £211.50 **Contact** Lexmark 01628 481500

Budget laser printer

Kyocera
FS-680

In a chassis designed by Porsche, the FS-680 is a speedy little printer, churning out 9ppm. It is aimed at small workgroups and you can buy an optional Ethernet adaptor to include it on the network. It also comes equipped with a 50MHz PowerPC processor and 4MB of RAM, upgradable to 36MB.

PCW September '99 p96

Price £351.33 **Contact** Kyocera 0345 103104 www.kyocera.de **Also recommended** Samsung ML-5100A **Price** £292.60 **Contact** Samsung 0800 521652 (PCW July '99 p98)

Business laser printer

Hewlett-Packard
LaserJet 4050TN

Hewlett-Packard dominates the laser printer market and it's easy to understand why when you see the output from this printer. Its 1,200dpi resolution is outstanding, and with a 133MHz NEC processor and 16MB of RAM it can turn out an impressive 16ppm. On top of all that it comes network-ready.

PCW September '99 p96

Price £1,580.38 **Contact** HP 0990 474747 www.europe.hp.com Also recommended Lexmark Optra K1220 **Price** £658 **Contact** Lexmark 01628 481500 (PCW February '99 p201)

Multifunction device

Hewlett-Packard
Office Jet R45

The Office Jet R45 is an excellent colour multifunction device. It has a colour inkjet printer, with a resolution of 600dpi, a colour scanner and a fax all in one. Its colour output is impressively rich and vibrant. The 30-bit scanner supports a maximum optical resolution of 600 x 2,400dpi and is fast, easy to use, and rendered excellent results.

PCW November '99 p96

Price £407 **Contact** Hewlett-Packard 0990 474747 www.hp.com (PCW November '99)

Flatbed scanner

Epson
GT-7000 USB

This 600dpi scanner performed excellently in all of our tests, with good colour accuracy, text reproduction, and picture quality. USB installation is a breeze and we were impressed with the robust build quality. The hinged lid will close flat to accommodate thick targets – all in all a great unit.

PCW November '99 p191

Price £179 **Contact** Epson 0800 220 546 www.epson.co.uk **Also Recommended** Black Widow 9636 USB **Price** £89 **Contact** Black Widow 01324 825 999 www.blackwidow.co.uk (PCW November '99)

best buys

Digital camera

Canon
Powershot Pro70

This good-looking camera takes amazingly natural-looking pictures and has enough features to keep any user happy. Its dual Compact Flash slots allow for extended periods without having to download, while its 1,536 x 1,024 pixel resolution will give you superb prints.

PCW May '99, p199

Price £1,173.80 **Contact** Canon 0121 666 6262 **Also Recommended** Ricoh RDC-4200 **Price** £500 **Contact** Johnson's Photopia 01782 753355 ◆ Olympus C-900 Zoom **Price** £586.32 **Contact** Olympus 0171 253 0513 (both PCW May '99)

Monitor

Taxan
Ergovision 980

The Taxan Ergovision 980 is based on the 19in Mitsubishi Natural Flat Diamondtron tube. It sports superb image quality and the array of OSD controls are intuitive and comprehensive. There's a built-in USB hub with two ports on the left and right side of the base, making it easy to connect peripherals.

PCW November '99 p208

Price £556.95 **Contact** Taxan 01344 484646 www.taxan.co.uk **Also recommended** Sony GDM-F400T9 **Price** £821.32 **Contact** Sony 0990 424424 www.sony.co.uk

Modem

3Com
56K Professional Message Modem

This excellent self-memory modem is flash upgradable to V.90, with 2MB of memory – enough for either 20 minutes of voice messages or 50 fax sheets or a combination of both. The memory is upgradable to 4MB. You can retrieve the voice messages remotely using a PIN number and modem is easy to set up.

PCW August '99, p191

Price £99 **Contact** 3Com UK 0800 225 252 www.3com.co.uk **Also Recommended** Diamond Multimedia Supra Express 56e Memory **Price** £99 **Contact** Diamond Multimedia UK 0118 944 4444 (both PCW August '99)

Removable storage

Iomega
Jaz 2

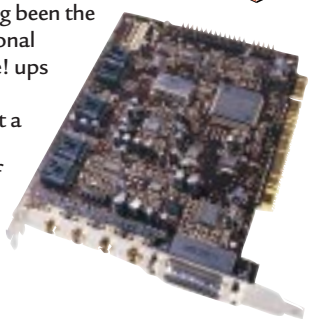
If you need top performance and storage capacity, then Iomega's 2GB Jaz drive is the only one to go for. Its speed makes it ideal for a wide range of applications, while the Jaz media feels more solid than most and is fully compatible with 1GB cartridges. In short, it represents good value for large storage capacity.

PCW June '99, p168

Price £299 **Contact** Iomega 0800 973194 **Also Recommended** Panasonic LF-D101 **Price** £386.57 **Contact** Panasonic 0800 444220 (PCW Oct '98)

Sound card

Creative Labs
SoundBlaster Live!



SoundBlaster cards have long been the best choice for non-professional users. The SoundBlaster Live! ups the ante, providing near-professional quality sound at a bargain price. And it comes with an impressive bundle of dedicated digital I/O daughtercard, speakers, subwoofer and games.

PCW December '98, p92

Price £149 **Contact** Creative Labs 01189 344744 **Also Recommended** Terratec EWS64 S **Price** £149.23 **Contact** Terratec 01600 772111 (PCW July '98)

Graphics card

Matrox
Millennium G400 Max

Once again Matrox is top of the tree when it comes to graphics cards. The Millennium G400 Max produces stunning performance in both 2D and 3D environments. It has 32MB of SGRAM and a 360MHz RAMDAC. You can also connect two monitors to the card.

PCW December '99, p188

Price £170.37 **Contact** Matrox 01753 665500 www.matrox.com **Also Recommended** ATi Rage Fury **Price** £123.38 **Contact** ATi 01628 533115 www.atitech.com (PCW May '99) ◆ Matrox Millennium G400 32MB Max **Price** £186.82 **Contact** Matrox 01753 665500 (PCW August '99)

Accounting

Intuit
Quickbooks 6

Touted as the easiest accounting package for small businesses, QuickBooks has a long history and a large user base. Version 6 is the first 32-bit incarnation. It even monitors company performance and sounds the alarm should you fall behind.

PCW November '99, p174

Price *£199 (Pro version)* **Contact** *Intuit 0800 585058* **Also Recommended** *MYOB* **Price** *£229.13* **Contact** *Bestware 01752 201901* ◆ *TAS Books* **Price** *£116.33* **Contact** *Megatech 01372 727274 (both PCW June '98)*

Personal Finance

Microsoft
Money Financial Suite 99

Microsoft Money Financial Suite 99 is our choice for personal finance. It offers online banking and updating facilities, as well as Sage compatibility, all at a bargain price.

PCW November '99, p182

Price *£49.94* **Contact** *Microsoft 0345 002000*
Also Recommended *Quicken 98* **Price** *£39.99* **Contact** *Intuit 0181 990 5500 (PCW June '98)*

Database

Microsoft
Access 2000

This industry-standard database application is also the best. With its wizards, infamous Office Assistants and standard Windows interface, Access 2000 is relatively easy for the novice. And its powerful relational features and VBA integration make it suitable for developers, too.

PCW November '98, p220

Price *£326* **Contact** *Microsoft 0345 002000*
Also Recommended *FileMaker Pro 4* **Price** *£169*
Contact *FileMaker 0845 603 9100 (PCW November '98)*

DTP

Adobe
InDesign

Seamless integration with PhotoShop and Illustrator, as well as multi-line text formatting, make InDesign a serious contender to knock QuarkXPress off its professional DTP throne. Time-saving features and a competitive price make it an attractive proposition.

PCW August '99, p87

Price *£468.83 (£399 ex VAT)* **Contact** *Adobe 0181 606 4000*
Also Recommended *QuarkXPress 4.0* **Price** *£816.62* **Contact** *Quark 01483 451818 (PCW June '99)* ◆ *Adobe PageMaker 6.5 Plus* **Price** *£351.33*
Contact *Adobe 0181 606 4000 (PCW August '99)*

Image Editing

Ulead
PhotoExpress 2.0

Ulead has succeeded in removing the frustration factor often involved in getting to grips with digital pictures. PhotoExpress 2.0 is a pleasure to use, with a clearly structured interface and fast, in-depth tools. It has pre-set editing modes for the novice and custom adjustments for each editing function, so the power user will be kept happy, too.

PCW January '99, p202

Price *£37.50* **Contact** *BIT 01420 83811* **Also Recommended** *Adobe PhotoDeluxe 3* **Price** *£45* **Contact** *Adobe 0181 606 4001* ◆ *Paint Shop Pro 5* **Price** *£99.81* **Contact** *Digital Workshop 01295 258335 (both PCW January '99)*

Drawing

Adobe
Illustrator 8

Illustrator has once again gained the top spot among drawing packages through its introduction of bold creative tools like the new Pencil Tool, Art Brushes and the Gradient Mesh Tool, to name but a few.

If Adobe's new page layout application, InDesign, takes off, the productivity gains from interoperability between InDesign, Photoshop and Illustrator will be hard to resist.

PCW September '99, p165

Price *£257.32* **Contact** *Adobe 0181 606 4001 www.adobe.com*
Also Recommended *CorelDraw 9* **Price** *£395.35* **Contact** *Corel 0800 581028* ◆ *Sierra Windows Draw 7* **Price** *£39.95* **Contact** *0118 920 9100 www.sierrahome.com (both PCW September '99)*

Information Managers

Starfish
Sidekick 99

The best personal information manager boasts wide customisation abilities as its greatest strength. However, if you need heavyweight contact management, look no further than Goldmine 4 (*see the details panel, below*).

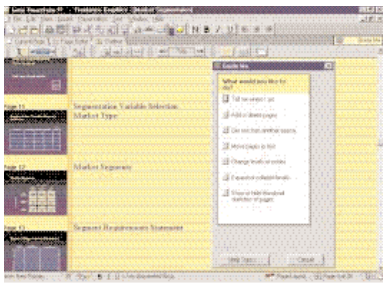
PCW August '99, p176

Price £39.99 **Contact** Starfish 0181 875 4455
Also Recommended Goldmine 4 **Price** £229 **Contact** AVG 0171 335 2222 (PCW August '99)

Presentation Graphics

Lotus
Freelance Graphics

Lotus' offering is our choice for electronic presentations. However, your decision may rest on which office suite you own or are considering, and as part of Office 97, PowerPoint won't let you down.



PCW March '98, p200

Price £49.35 **Contact** Lotus 01784 445808
Also Recommended Microsoft PowerPoint 97 **Price** £325.47
Contact Microsoft 0345 002000 (PCW March '98)

Remote Access

Traveling Software
LapLink Professional

The high-end version of this extremely versatile product, LapLink Professional, has all the features of the standard version but also lets you print from the host machine onto a remote printer, or vice versa, and talk to whoever is using the host machine. It includes anti-virus and hard-disk cloning utilities.

PCW October '99, p134

Price £176.19 **Contact** Traveling Software 0800 374849
Also Recommended Symantec pcAnywhere **Price** £169.20
Contact Symantec 0171 616 5600 (PCW October '99)

Web Design

Macromedia
Dreamweaver 2

An attractive and easy-to-use interface makes this great for those looking for something with a little more power. Good table handling and extensive formatting options on a single, centralised property inspector, make it a joy to use.

PCW December '99, p203

Price £269.70 **Contact** Computers Unlimited 0181 358 5857
Also Recommended Adobe PageMill 3.0 **Price** £92.83
Contact Adobe 0181 606 4000 (PCW March '99)

Programming Tool

Inprise
Delphi 4

Delphi is not a cross-platform product, but does let you build browser-independent web applications. It reaches all the way from RAD business applications to fast graphics using DirectX. It beats Visual C++ on ease of use, and Visual Basic on performance.

PCW April '99, p198

Price from £99 to £1,999 **Contact** Inprise 0118 932 0022
Also Recommended Symantec Visual Cafe **Price** £217 or £580
Contact Symantec 0181 317 7777 (PCW April '99)

Anti-Virus

McAfee
VirusScan Platinum

McAfee VirusScan Platinum's background scanning checks mail attachments, internet downloads and even ActiveX and Java applets for comprehensive protection.

PCW July '99, p86

Price £59.95 **Contact** Network Associates 01753 827500
Also Recommended Dr Solomon's HomeGuard **Price** £29
Contact Dr Solomon's 01296 318700 (PCW April '98)

hands on

contents

This month's *Hands On* has a wealth of practical advice, whether it's maximising hard disk space in Windows 98, or moving your CD-ROM drive to a different letter under NT.

In Unix, Chris Bidmead is on hand to tell you how you can turn a PC into a completely **free fileserver** for your network [p245], while Ken McMahon [p262] and Benjamin Woolley [p264] look at images that are **more than just pixels** on a flat screen.

And for web weavers, Tim Anderson explains how to handle **form data** [p235].

On the lighter side, Apple guru Cliff Joseph explains how you can turn your Mac into a **PlayStation** [p270], while Mark Whitehorn first pulls his hair out over **postcodes**, and then starts clicking on the fish that have taken over his PDA [p242].

We hope to bring you more *Hands On* pages on our cover CDs in 2000, but in the meantime, please keep sending your comments and queries – as you'll see from reading this month's columns, it's you the readers who help to make *Hands On* a vital source of information.

NIGEL WHITFIELD, HANDS ON EDITOR,
NIGEL_WHITFIELD@VNU.CO.UK

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Tim Anderson looks at tool bars and the best ways to reach your data, as well as finding out how to get in the right frame of mind with Delphi

MISCELLANEOUS

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The camera never lies

Nigel Whitfield invites his adoring public to share his world when he sets up his own webcam.

One way to grab your 15 minutes of fame is via a webcam. A phenomenon of the 1990s, it has persuaded hundreds of people around the world to share their own world with the public.

Webcams have evolved considerably since the first ones which showed things like coffee pots. Now you can watch just about everything imaginable – the Millennium Dome, students at home, ghosts, traffic and plenty more.

Thanks to cheap hardware, joining them is fairly straightforward – but it pays to plan a little. This month's workshop shows you how to set one up using either Ispy for Windows or Oculus for the Mac. Both programs are available for download from the net. Whether you want to give people a glimpse of your garden, keep an eye on things when you're away from home or share every moment of your life with strangers, a webcam is quicker and easier to configure than a live video broadcast.

Size is everything

Before getting into the mechanics of setting up a webcam page, it's worth checking a few things with your internet provider. How much bandwidth do you have available for people to visit your site? A popular cam could bring lots of visitors to your website, some of them leaving their PCs connected while they get on with other things. The images you're using for a webcam picture might appear small and of little consequence, but when they're continuously updated, you could start to come close to limits for downloads, depending on the terms imposed by your ISP.

The jpeg image we created using Oculus took up 36KB of disk space. And by choosing the quality of your pictures, you can reduce that still further.

If you want visitors to your site to see a reasonable amount of movement, you might decide to upload a new picture every 15 seconds, for example. For a 25KB image, that amounts to 100KB of data per minute, which is easy to upload even with a modest modem.

But when you think about the people looking at your cam, that translates into 6MB of data downloaded from your website per viewer, per hour. If you have a daily bandwidth limit of only 100Mb, it's easy to see how even a slightly popular webcam could push you over the edge.

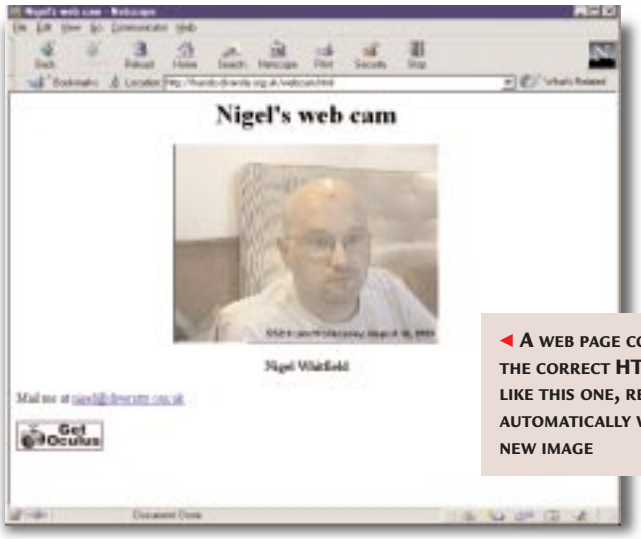
Webcams have evolved considerably since the first ones which showed things like coffee pots

Therefore, tweaking the size and quality of the image to make it as small as possible, and choosing the number of times viewers get a new picture, can be crucial to making things work.

Page updates

It might seem tempting to put a webcam in a corner of your home page, but it could also be a big mistake. Typically, a webcam works by refreshing a page periodically, to collect a new image. If you have the cam on a page with a lot of other graphics and multimedia elements, you'll be forcing your viewers to download those too, slowing everything down and eating up any bandwidth allowance.

So, then, if you want a webcam to appear on a page with other elements, the most sensible tactic is probably to use frames, with the cam in a separate frame, which can be programmed to refresh on its own.



◄ A WEB PAGE CONTAINING THE CORRECT HTML WILL, LIKE THIS ONE, REFRESH AUTOMATICALLY WITH A NEW IMAGE

While many webcam programs will create a page for you, it's worth understanding the HTML code that makes everything work. This is what you'll need in the HEAD section of a page called webcam.html to ensure that it refreshes every 30 seconds:

```
<META HTTP-EQUIV="Pragma" ↙
CONTENT="no-cache">
<META HTTP-EQUIV="refresh" ↙
CONTENT="30; URL=webcam.html">
```

(Key: ↙ code string continues)

The first line tells the browser it should always reload the page. Older browsers may not understand it and, as a result, viewers may not see changing images, but current editions of Netscape and IE will respect the no-cache directive.

The second line causes the page to reload every 30 seconds. Changing the number here – rather than in the webcam program – alters the frequency with which visitors will see a new picture. Ideally, you should set the time delay to the same interval you're using to upload pictures; certainly it shouldn't be shorter.

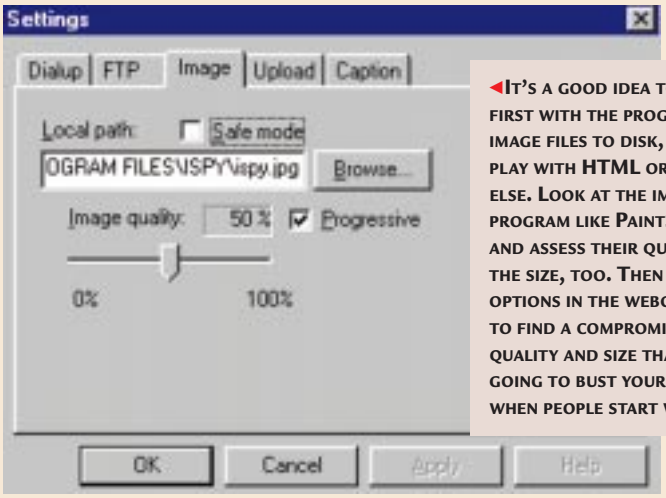
Home vs away

Most webcam programs offer two options for saving images – uploading them to a web server or saving them on

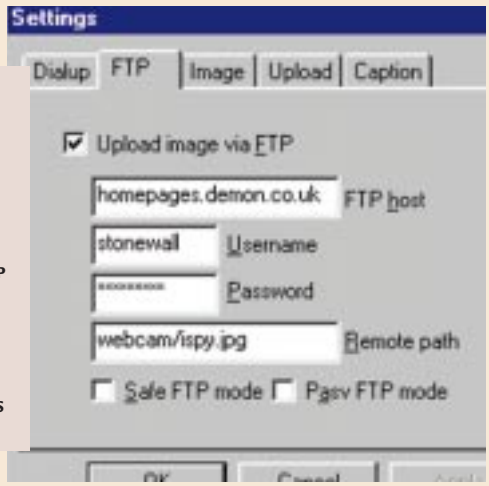
SETTING IT ALL UP

The first stage in getting up and running is configuring your video camera. You need to make sure the webcam is getting a decent image, using the preview option of the software. Here, we're using Ispy, which allows options such as brightness and contrast to be set, to ensure that the best possible image is grabbed from the camera.

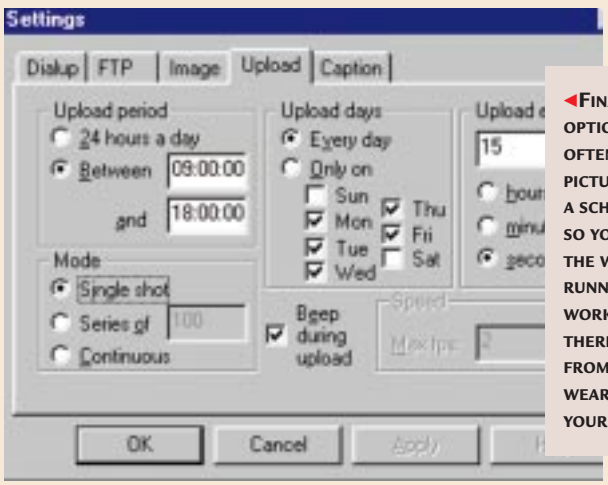
If you're using a cam indoors, it might be best to arrange the lighting in a room to help with this.



◀IT'S A GOOD IDEA TO EXPERIMENT FIRST WITH THE PROGRAM, SAVING IMAGE FILES TO DISK, BEFORE YOU PLAY WITH HTML OR ANYTHING ELSE. LOOK AT THE IMAGES IN A PROGRAM LIKE PAINTSHOP PRO AND ASSESS THEIR QUALITY. CHECK THE SIZE, TOO. THEN TWEAK THE OPTIONS IN THE WEBCAM PROGRAM TO FIND A COMPROMISE BETWEEN QUALITY AND SIZE THAT'S NOT GOING TO BUST YOUR BANDWIDTH WHEN PEOPLE START WATCHING



▶NEXT, CREATE YOUR WEB PAGE AND CONFIGURE THE FTP PART OF THE PROGRAM TO HANDLE THE UPLOAD IF YOU'RE USING A WEB SERVER ON A DIFFERENT MACHINE. SOME PROGRAMS, LIKE ISPY, WILL LET YOU SPECIFY WHICH DIALUP CONNECTION TO USE. THE SAFE FTP MODE HERE UPLOADS THE NEW PICTURE WITH A DIFFERENT NAME, THEN RENAMES IT IF THE TRANSFER WAS SUCCESSFUL, AVOIDING PROBLEMS IF THE CONNECTION DIES PART OF THE WAY THROUGH



◀FINALLY, SET THE OPTIONS TO SAY HOW OFTEN YOU WANT A PICTURE UPLOADED, WITH A SCHEDULE IF NECESSARY, SO YOU CAN JUST LEAVE THE WEBCAM PROGRAM RUNNING AND LET IT DO ITS WORK. AND THAT IS ALL THERE IS TO IT – APART FROM CHOOSING WHAT TO WEAR WHEN IT'S TIME FOR YOUR CLOSE-UP

your hard drive. The latter option is particularly helpful for testing. If you are on a LAN that's connected to the net, or you can mount your web space as a shared drive on your computer, then it's also easier than fiddling around with the setup for an FTP connection.

However, if, like a lot of home users, you connect to the internet via a dialup connection, it would probably be more sensible to configure the cam to ftp to a separate web server.

While you are running the webcam on your desktop system, you can avoid bandwidth restrictions by using Windows Personal Web Server or the Web Sharing extension on a Macintosh. However, it will also give a pretty poor performance once more than a few people have tuned in to watch your webcam.

We have had a look at two programs that are simple to use to create a webcam – Ispy for Windows and Oculus for the Mac. Both can be downloaded

Most webcams offer two options for saving images – uploading or saving to a hard drive

from the internet in demo form, which will allow you to create a page and upload pictures. The only other thing you'll need is a video capture device on your system, supported by QuickTime for the Macintosh or Video for Windows on the PC.

Both these programs are straightforward to use. In the case of Oculus, the setup wizard will create a basic webcam page, with the necessary HTML code to ensure that it refreshes. Both offer a similar range of features, with time-stamped captions and the ability to upload pictures only during certain hours of the day. Oculus can also upload images, based on whether or not there has been any movement since the last image was grabbed.

PCW CONTACTS

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Ispy www.ispy.nl
Oculus www.intlweb.com

Desktop inspection

MONTH TO GO!

These are difficult times for anyone managing a network, reveals Bob Walder.

If you thought the millennium bug only infected legacy mainframe systems, think again. Another area that has received huge amounts of publicity – probably because it is one of the few areas that can have an automated quick-fix applied – is your desktop PC.

The good news is that most PCs can be updated to handle the turn of the century. However, identifying which machines in your organisation will experience year 2000 problems and then fixing them can be time-consuming, resource-intensive and costly. When you have more than a couple of PCs on a network, it is much more difficult to make sure they all comply. Get it wrong on one of your file servers and you could find your whole network out of action.

DIY compliance testing is not to be undertaken lightly, even on small networks. On larger LANs, even with an automated testing tool, it has most managers breaking out in a cold sweat. Visiting every PC on the network to check compliance means rebooting a couple of times, keeping users idle while you carry out the tests.

Not only that, but once PCs have been made year 2000 compliant, they should be monitored regularly to ensure they stay compliant. If you have installed a patch which kicks in on 1 January 2000, to correct the century problem, for instance, you do not want a 'helpful' user to wipe it out while doing a spot of housekeeping.

Given the scale of the problem, it is surprising that vendors which already produce network-wide auditing software have not added a compliance checking element. However, UK startup Centennial has come up with a solution. Centennial 2000 is a process-driven audit, update and monitoring package, where each stage of the process is controlled from a central console and completed as users log on to the network.

The extensive audit tests include checking for year 2000 Bios, RTC and leap year compliance; PC manufacturer and processor type; operating system and version, Bios ID, date and manufacturer; PC memory size; hard-disk drives, capacities and free space; and the CD-ROM drive. It thus provides a complete hardware audit as well as compliance check. If the Bios can be positively identified and an upgrade is possible, a flash Bios update is performed automatically. Where this is not advisable, a software fix is applied.

Where Centennial 2000 really scores is in the network-based centralised administration in the Enterprise version (a Lite version is available for standalone machines). This is performed via the Control Centre, through which network administrators can specify PC auditing by individual, department or other organisation units from a single console. This provides full automation of the testing process on all networked PCs, even those at remote sites or on the road.

Centennial 2000 Enterprise will also correct non-compliant systems, provide detailed audit reports and continue to monitor each PC automatically. This level of functionality is essential if managers of large PC networks are to be expected to get to grips with the problem.

There is one other item which needs considering before we leave the topic of networks, and that is the software contained in the various network hardware devices – bridges, routers, switches and hubs. Some of these devices will not depend on dates, of course, and therefore will not need updating.

But how can you be sure? Devices that implement Quality Of Service may use date and time stamps to prioritise traffic. Routers may use date and time fields in their router tables. Make sure you obtain guarantees from all your network hardware vendors on year 2000 compliance if you don't want your network to come crashing around your ears on New Year's Day 2000.

ACCESS AND YEAR 2000

Microsoft Access 2 for Windows 3.x assumes all two-digit years refer to the 20th Century. You will need a software update <http://support.microsoft.com/support/kb/articles/Q231/4/08.asp> so that it recognises the digits 00-30 as referring to 2000-2030. This patch was unavailable as *PCW* went to press, putting pressure on users to consider a full upgrade.

You may be able to avoid issues by using the long format for all dates and using date/time fields, not text fields, in date-related tables.

Access 95 for Win95 will only properly interpret dates with two-digit years in the 1930-2029 reference frame if you have the file OLEAUT32.DLL (version 2.20.00.4054 or later) in the system folder <www.microsoft.com/technet/year2k/product/user_view68287EN.htm>.

If you use the Access Developer's Toolkit to redistribute updated Access run-time files, install the full compliance update from http://officeupdate.microsoft.com/articles/O95y2kfactsheet.htm>.

Access 97 for Win 95 has built-in support for the two-digit year format, but the Office 97 Service Release 2 fix is required to be fully Year 2000-ready <office update.microsoft.com/articles/sr2fact.htm >. But dates formatted with two-digit years in text files may not be imported or exported correctly (to text files) by Outlook 97.

Information on an issue with dates in the QBE grid and an object's properties sheet is at http://support.microsoft.com/support/kb/articles/Q172/7/33.asp.

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Centennial 01488 682444

The name game

Nigel Whitfield takes an in-depth look at the complicate[illegible] domain.

What's in a name? On the internet, an awful lot, as the domain name system is the key to finding information – and thanks to recent changes, it's easier than ever to get hold of a name of your own.

When the UK domain naming system was put on a more professional footing a few years ago, there were some who complained loudly and vigorously about the charges.

They may perhaps consider eating their words now, with the most recent reductions in charges for Nominet members meaning that registering a domain costs only a few pounds. Some enterprising providers are even giving them away free of charge – so if you want a .co.uk address, there's little reason not to have one any more.

The same, unfortunately, can't be said of the international domains. Although the top-level domains like .com and .org are supposed to have been freed from the monopoly of registrations that belonged to Network Solutions, in practice, things have been dragging on for months, with trials to provide other registrars with access to the databases being extended.

Thanks to recent changes, it's easier than ever to get hold of a domain name

The net result hasn't been a pretty sight, with many people complaining of delays and, in some cases, different registries giving different answers to the question of whether or not a particular domain is available – hardly an ideal situation.

So far at least, the competition beloved of the Americans doesn't appear to have brought the benefits – in particular, cheaper prices – that many net users would like to see. When everything's running properly that may yet happen, but in the meantime don't hold your breath.

Assuming you do decide to register a domain, what do you actually need to do – and if you're paying someone else, what exactly are you paying them for, given that the Nominet fees for a UK domain are minimal?

It's worth looking at this in some detail, since it's a question that often comes up – and there's a little more to sorting everything out than some users realise. It's not just a question of a simple entry in the DNS to point to a web server and redirect mail, if you want to use the domain properly.

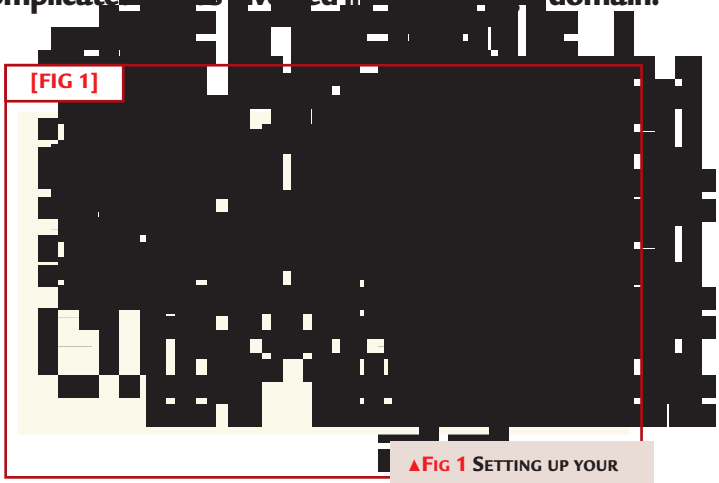
The amount of work you need to do for a domain depends on exactly what you're planning to do with it, but at the very least, you're likely to need 'A' and 'MX' records.

The A records in the DNS specify an address – you'll need them to point to a web server, or other systems that you want people to access by name, such as an FTP server.

Those servers will need to be configured to respond to the address – or in the case of a web server, you'll need some other way to rewrite requests, if you want to map your new domain onto an old server, for example, pointing a domain at the free space that came with your net access.

MX (Mail Exchanger) records are the part of the DNS that controls where your email is delivered. You can have more than one, and each has a preference assigned. When someone tries to send you email, the lowest preference MX is tried first, then the others. If you're setting up a domain yourself, perhaps by editing the files on a Unix system to run your own name server, you'll need to give this a bit of thought.

[FIG 1]



▲FIG 1 SETTING UP YOUR MX RECORDS REQUIRES CARE; YOU NEED THE FINAL ENTRIES TO ENSURE THAT MAIL ADDRESSED TO YOUR DOMAIN, WITH NO SYSTEM NAME, ARE ROUTED CORRECTLY

Setting up the mail can be one of the trickiest aspects of all this; you'll need to make sure that any machine that's listed as an MX for your domain will accept the messages and forward them properly to the final host. And you might even need to rewrite addresses too, delving into the innards of a mailer.

This isn't a trivial exercise, especially if you've never done it before. It's very easy to make simple mistakes, like providing MX entries for all the computers in a domain, but not the domain itself – effectively meaning you could mail to user@somemachine.somedomain.com, but not user@somedomain.com.

Fig 1 shows part of a 'zone' file, setting up both A and MX records for a network of machines, with two systems handling email.

When you pay someone to host a domain for you, this, far more than the amount of work in the registration, is what you're paying for. You may also be paying for storage space for email, or web pages, depending on the deal that's on offer.

If you do go it alone and run your own domain – which means that you'll need to configure name servers on machines with fixed links to the net –

Questions & answers

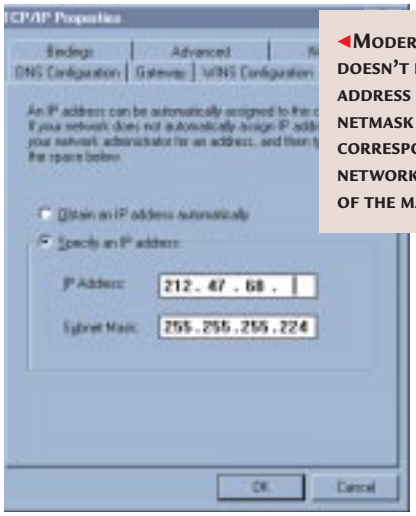
Q I want to configure an internet connection, but I don't understand all about Classes of addresses. What is a Class C network? What's the minimum number of addresses that can be allocated?

A *When the internet was much less widespread, addresses were allocated in blocks called networks. A Class C network has 256 addresses, a Class B has 65,636 and a Class A has 256 times as many as that. The first few bits of an internet address were used to indicate which class of address it was; there are only a handful of class A addresses, a larger number of class Bs, and lots of class Cs.*

However, allocating a class C network to a small company that might only have a dozen computers is wasteful – there could be over 200 addresses unused. With this in mind, IP addresses are no longer allocated in classes. Instead, you receive an allocation based on the number of bits that identify the network. For example, my net connection is referred to as a /27. In other words, 27 bits of the address identify the network, leaving five for the systems – 32 addresses.

On each network, the address with all the final bits set to either one or zero is reserved, taking two out of the total. So the smallest network you could theoretically be allocated would be a /30, allowing for two usable addresses, though that would be unlikely.

Any software that's still asking you what class of net address you have is probably old enough to warrant replacing.



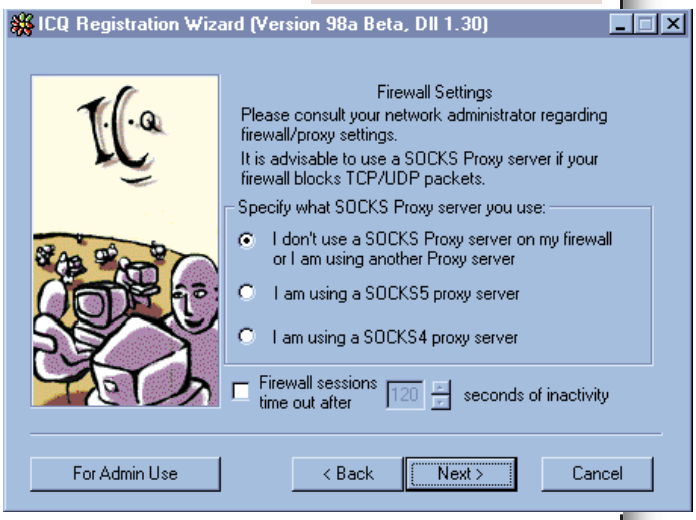
◀ MODERN TCP/IP SOFTWARE DOESN'T BOTHER WITH ADDRESS CLASSES. THE NETMASK SHOWN HERE CORRESPONDS TO A /27 NETWORK, IE THE FIRST 27 BITS OF THE MASK ARE ALL ONES

Q I'm trying to configure ICQ to work from my office, so that I can keep in touch with friends elsewhere, but I can't get it to connect to the server. What's the problem?

A *It's likely that the connection you have in your office is running through some sort of firewall, and while ICQ can be configured to work through a SOCKS-based firewall, it won't work with some other types, especially those that appear to be transparent to end applications.*

You have two solutions. One is to ask the people who run your network to allow connections for ICQ, which requires passing UDP data through the firewall on port 4000, or use a different instant messaging system. For example, AOL Instant Messenger may work, depending on the configuration of your firewall.

▼ ICQ CAN BE CONFIGURED TO WORK THROUGH A FIREWALL, BUT IF YOU HAVE A NON-STANDARD ONE, IT'S TIME TO SPEAK TO THE NETWORK ADMINISTRATORS



you'll also come across something else that has to be done.

Reverse DNS is the part of the DNS that maps an IP address back to a domain name. It's not strictly essential – many people use connections that don't have reverse DNS configured – but it's very useful. Some sites, for example, will not accept FTP connections from machines with no or invalid reverse DNS. The same holds true of IRC servers as well as many firewall systems.

Setting up reverse DNS is a little tricky. Sure, the files you need to configure are straightforward enough, but what most of the manuals won't tell you is that it probably won't do you any good; you will typically need to arrange with your internet provider, to whom a block of IP addresses has been delegated, to run the reverse DNS for you – so be absolutely sure that you give them exactly the same information as you'll be providing in any files running on your systems.

While registering a domain is easy, in practice, it can be rather fiddly

In short, while registering a domain is easy – and, as long as you have a suitable connection, with a bit of work you can do all the management yourself – in practice it can be rather fiddly. If you want to find out more, recommended reading is *DNS and BIND*, published by O'Reilly.

PCW CONTACTS

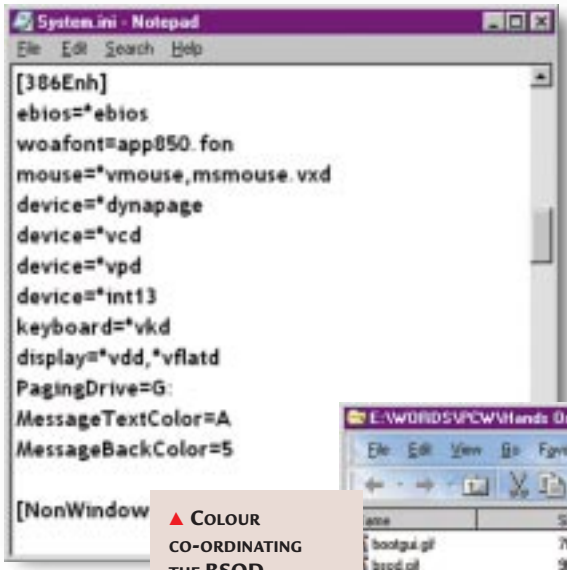
Nigel Whitfield welcomes your feedback on the internet column. Contact him via the PCW editorial office or email internet@pcw.co.uk

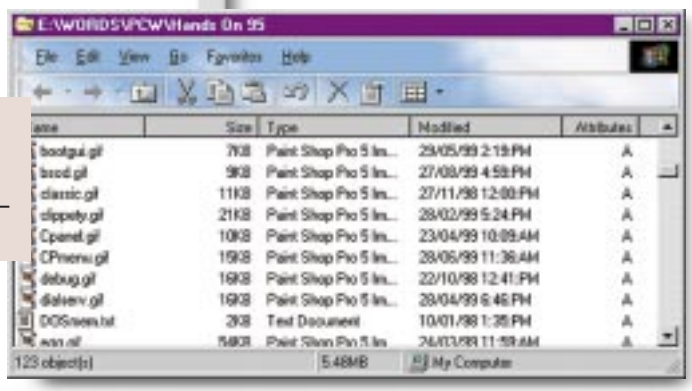
The colour of Windows

Tim Nott sees the world through rose-coloured screens and holds the key to password security.

Last month's spoof on customising the Blue Screen Of Death (BSOD) has been worrying me, as I had this nagging feeling that somewhere I'd read that it really was possible to have, for example, a Mauve Screen Of Death (MSOD), although not, alas, a Paisley one.

After some digging around, I found that by some incredible coincidence the tip appeared exactly five years ago, in this very column. As Windows historians will realise, this places the tip back in the 16bit world of Windows 3.1, but having checked – much to my amazement – it still works in Windows 98.





▲ COLOUR CO-ORDINATING THE BSOD
▶ FILE ATTRIBUTES – NOW YOU SEE THEM

To customise the screen, use Notepad to open the file SYSTEM.INI, which resides in the Windows folder. In the section headed [386Enh] add the following entries:

```
MessageTextColor=A
MessageBackColor=5
```

Reboot, and you'll find your BSOD has changed to a MSOD with green text.

The only remaining problem is that, despite last month's piece, I have to admit it's very rare to get this screen in Windows 98. One way to provoke it is to eject a floppy or CD-ROM while trying to read from it. If you want to try other colours, then they are assigned as in Fig 1. However, setting the background colour to a value greater than seven seems to revert to the corresponding darker colour.

[FIG 1]

Codes to the system screen colours

0	Black	8	Dark Grey
1	Dark Blue	9	Blue
2	Dark Green	A	Green
3	Dark Cyan	B	Cyan
4	Dark Red	C	Red
5	Dark Mauve	D	Mauve
6	Dark Yellow	E	Yellow
7	Grey	F	White

■ **Great advice?**

Although the MS Knowledge Base (the company's online support web pages) is a mine of useful information, I was rather taken aback by the following article, which you can find at http://support.microsoft.com/support/kb/articles/Q221/8/29.ASP. 'How to install Windows 98 on a machine with no operating system.

1) Insert The Windows 98 CD in the CD-ROM drive.
2) If necessary, type the following at the DOS prompt to change to the CD-ROM drive:
cd <drive>: (where <drive> is the drive letter of your CD-ROM drive).
3) Type SETUP at the command prompt and press ENTER:'

For those who don't see the joke, then if a PC has a DOS prompt, then it has an operating system. However, in fairness to Microsoft, this article (Q221829) has since been updated to include the essential step of booting from a floppy, and there's comprehensive advice about Fdisk, partitioning and FAT16 versus FAT32.

■ **Better advice**

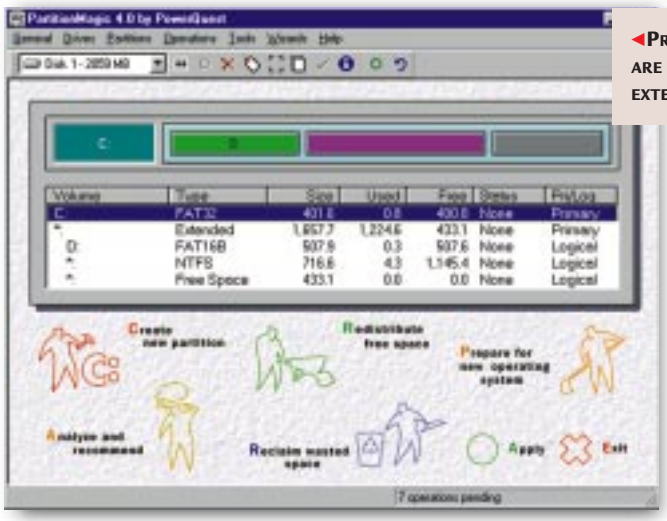
Ian Chapple, Carol Steele, Alex Nicholl and Matthew Day all took me to task for stating that physical drives are listed before partitions, so that if you have more than one hard disk, splitting the C: drive will create partition letters that straddle the other drives.

I'd read that it really was possible to have a Mauve Screen of Death

This isn't the case – what is true is that primary partitions are listed before extended ones. So, if you configure the second drive as extended partitions only, its drive letters will run after all those on the first drive.

Matthew has more to say on the subject: 'In the rush to partition, care is needed not to generate a layout which requires frequent partition crossing, as that means extra seek-time delays. It is better to split mutually active files between real drives, or keep them on the same partition.

'Before FAT32, drives were partitioned first as the only way to handle drives



PRIMARY PARTITIONS ARE LISTED BEFORE EXTENDED ONES

larger than 2GB, and second to alleviate the large cluster size and consequent space wastage on smaller files. FAT32 lets you handle large drives with a 4K cluster, but the penalty is abysmal defragmentation and scandisk times.'

Lost attributes

Last month I mentioned that TweakUI had been removed from Windows 98 SE. Apparently, another casualty is the facility to view file attributes in Explorer's 'Details' view. If you upgrade from Windows 98 to 98 SE, you'll still have this feature, but not, it seems, on a clean installation. I'm most grateful to Nigel Smith for pointing out the problem and supplying a solution.

What appears to have happened is that Microsoft left out the necessary Registry entries in Windows 98 SE, but copying those from an original Windows 98 installation does the trick. The key to export is:

```
HKEY_LOCAL_MACHINE\ Software\
Microsoft\ Windows\
CurrentVersion\ Explorer\
Advanced\ Folder\
ShowAttribCol
```

Who goes there?

Passwords are a necessary nuisance. At the last count I had over 20 of the damned things, including BIOS settings, dial-up networking, Office documents, web discussion groups, beta sites, mailboxes, online shopping and so on. It's impossible to remember them all. So it's very tempting to let the PC do this for you.

Passwords can be 'remembered' by a PC in various ways. First, there's the Windows Password list (.PWL) file. Typical candidates include usernames and passwords for DUN connections and some websites.

Note that although the PWL file is encrypted, anyone who has access to your PC will be able to use these passwords. Worse still, there are utilities (see April's column) that will reveal the true password instead of the row of asterisks you see, for example, in DUN connections.

CONVENIENT – BUT NOT SAFE

Both Windows 95 and 98 come with a utility, buried deep on the CD, called PWLEDIT.EXE which will show which services have cached passwords (although not the passwords themselves) and let you remove them.

The most secure password uses a mixture of upper and lower case letters

A password can be automatically remembered by proprietary software, such as mail programs – always as an option you can turn off. Many websites can also store your password in a 'cookie', which means that anyone with access to your PC has access to these services.

The important thing to decide is what needs to be secure and what doesn't. I couldn't really care less if someone logged on to a press release service pretending to be me. I'd be very concerned, however, if they could access my mailbox or log on to my bank account. For the non-sensitive stuff, the answer is simple – let the PC do the work, or if that isn't possible, use the same password.

Neither of these approaches should ever be used if security is important, and there are other golden rules of secure password control. Don't use your wife/husband/dog's name, your car registration, phone number or any string that can be associated with you. Change your password frequently.

Undoubtedly the most secure password is one that uses a mixture of upper and lower case letters and digits. But who can remember q28Ub7h2aj? A good compromise is to do what, for example, Compuserve does when it first generates a password for new users. Take two ordinary, but unrelated, dictionary words and combine them – such as voltage+daffodil or bouncy+doorknob.

If you are not blessed with an eidetic memory, and have to store your passwords, be cunning. Passwords can masquerade as entries in an address book, or in a misleadingly-titled Word file which is itself password-protected.

Alternatively, you could write down a list and keep it in a safe place – preferably in another room. Then all you have to do is remember the safe place.

Tip – hide it in between the pages of Dante's *Inferno*. No-one will ever open it, and when you ask yourself: 'Where in hell did I put that password?' – well, need I say more?

PCW CONTACTS

ZipMagic and FreeSpace can be found at www.mijenix.com
Partition Magic is at www.powerquest.com
Partition It is available from www.symantec.com
Tim Nott welcomes your feedback on the Windows column. Contact him via the PCW editorial office, or email win@pcw.co.uk

Questions & answers

Q My computer runs Windows 98 and has ceased to shut down when I select the Shut Down radio button on the Shut Down Windows panel. Instead it restarts! There's no delay or any other problem that I can see, but I end up having to switch off as the thing starts to boot up again. What have I lost?

JOHN LONGBOTTOM

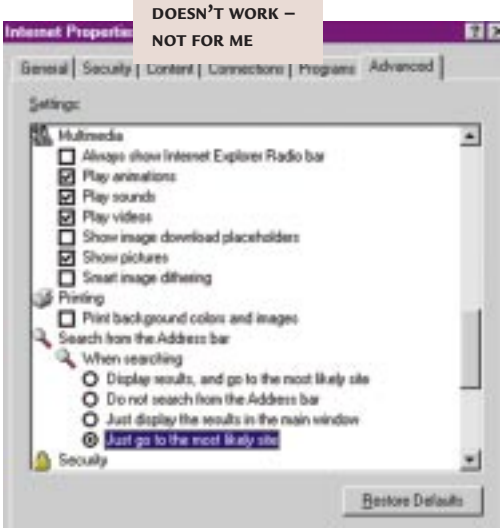
A *This seems to be a common problem: try running the Windows 98 System Configuration Utility (MSCONFIG.EXE) and on the General Tab clicking the Advanced button. The ensuing dialog gives you the option to disable fast shut-downs: in many cases this cures the problem.*

Q I would like to be able to just type 'hotmail' in the address bar and have the browser bring up the address, without going through the Auto Search function. The idea is to avoid typing www.blahblah.com in full. It is odd that I cannot do this in IE 5, yet I could in IE 4. Am I missing something out in the tools menu?

JENNII WALLACE

A *IE4 keeps a list of masks in the registry – so if you type in 'blahblah' it will try www.blahblah.com, then www.blahblah.org and so on, until it gets a hit or runs out of possibilities – the list is editable, so you can add www...co.uk as a mask. IE5 has been improved, in that if you type in an incomplete site address, it will do a web search and return a list of the most likely matches. If you just want to go straight to the first hit, then go to Tools, Options, Advanced and scroll down through the list until you find 'Search from the Address bar'. Then select the 'Just go to the most likely site' option. The only remaining problem is that it doesn't work. The MSN search engine seems to muscle in on the act – whatever I choose I still get the list.*

▼ BUT THIS DOESN'T WORK – NOT FOR ME



Q I am using Windows 95 but have a small problem when trying to open files in certain programs, including Notepad, Wordpad, Paint Shop Pro and others. The problem is the files appear in no particular order so the file I am looking for is hard to find.

KEITH BELL

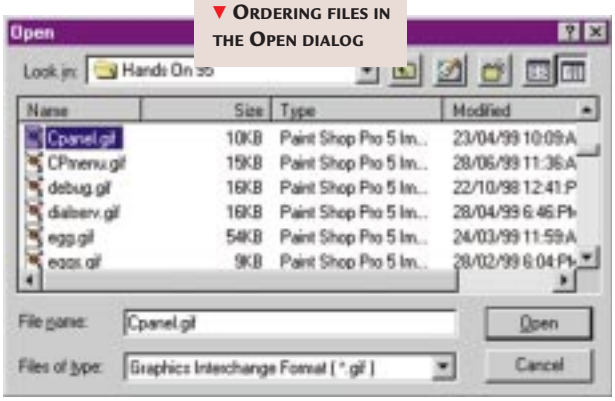
A *On the toolbar of the File Open dialog, click on the Details button – the one on the far right. You'll then see columns for date, size, etc as well as for name. Click on any one of the column heads to order files by that column. Click again to reverse the order.*

Q When I start MS-DOS from the Start Menu it covers the entire screen – how can I get it back to working within a normal window?

ROLAND CLEMENTS

A *Pressing Alt + Enter will toggle between window and full screen. Once in a window you can click on the icon at the left of the window title bar and choose Properties. On the Program tab, check that Normal Window is selected in the Run box, and in the Screen tab, check that Window is selected under Usage. These settings should then stick. Alternatively, you can get at these properties by exploring the Start Menu and right-clicking on the MS-DOS prompt shortcut.*

▼ ORDERING FILES IN THE OPEN DIALOG



Q I want to compress my computer's hard drive using Drivespace. When I click Compress the computer tells me that it cannot comply because my hard drive is in FAT32 mode. Could you please tell me how to get my hard drive out of FAT32 mode and into standard mode?

JOHN CLUBLEY

A *Bad news, I'm afraid. You need to use FDISK to create new partitions on your hard disk, then FORMAT it. This will destroy all data on the disk and so you will have to back up all your data first, and reinstall Windows and applications afterwards.*

Alternatively, there are third-party utilities, such as Partition Magic or Partition It, that do this non-destructively, but it would still be wise to back up first. Finally, a third alternative is to use a different sort of compression, ZipMagic and FreeSpace, for example, compresses on a per-folder basis, and support both FAT16 or FAT32.

Q Recently, I've been getting messages that my copy of Office 2000 beta has expired. Only snag is that I don't have – and never have had – a copy of Office 2000 beta.

ANDREW SINGER

A *This is what we conspiracy theorists call a cock-up on the part of Microsoft. What, in fact, has happened is that you have a beta copy of IE 5 which is past its eat-by date. Replace this with one from the PCW CD-ROM or download from www.microsoft.com, and all will be well.*

Ready for interaction

Tim Anderson gets to grips with how to read form variables from a CGI script.

If you have been following this column over the past few months, you will have seen a couple of ways of getting dynamic content back from a web server. One is Server-Side Includes (SSI) and another is Perl. So far, though, it has not been truly interactive. The next step is to take information entered by the user and to do something with it.

The starting point for this kind of interactivity is an HTML form. A bare-bones form looks like Fig 1.

[FIG 1]

```
<FORM ACTION="/cgi-bin/hello.pl" METHOD=GET>
<p>Enter your name: <INPUT TYPE="text" NAME="username">
<p><INPUT TYPE="submit">
<INPUT TYPE="reset">
</FORM>
```

(Key: ↙ code string continues)

There are several key elements. First, the ACTION attribute identifies the URL that is the target of the form. This is similar to the HREF attribute of an anchor tag, except that it typically identifies a CGI script or executable.

The METHOD attribute can have the value GET or POST. You need to think about a lower level of HTTP than you usually see in a web browser. Web servers accept requests and return responses. An HTTP request looks like Fig 2.

[FIG 2]

```
<method> <request_URI> <HTTP_Version>
<header1_fieldname>: <field1_value>
...other header fields
<data>
```

In this format, URI stands for Uniform Resource Identifier, which is similar to a URL. The METHOD tells the web server what sort of request is being received. When a web browser requests a web page, the actual request sent over HTTP might look like this:

```
GET /index.html HTTP/1.1
Host: www.onlyconnect.co.uk
```

There are eight methods defined by the latest HTTP 1.1 specification: OPTIONS, GET, HEAD, POST, PUT, DELETE, TRACE and CONNECT. Extension methods may also be defined. Each method is officially described in web standards document RFC 2616.

Back to the form

Returning to the HTML form, the METHOD attribute lets you choose between the GET and POST request methods. The request is activated when the Submit button is clicked. If you choose the GET method, the request from the example form looks like this:

```
GET /cgi-bin/hello.pl?username=whatever
```

Other field values are tagged on the end, with each name=value pair separated by an ampersand.

If you choose the POST method, the request looks like Fig 3.

Both techniques are common, although POST is the preferred standard. One reason for this is that the reliable length of a URL is only 255 characters, whereas POST allows more flexibility. The counter-argument is that GET is usually a little quicker.

Reading the request

The next step is for your Perl script or CGI executable to read the request. In the simplest case, the web server calls the executable and sets some environment variables containing details of the request. If there is data in the request, it is sent to the standard input stream, as if it had been typed at the keyboard. A slight complication is that special characters such as spaces, slashes or queries are encoded. Fig 4 shows a Perl script that reveals all.

The script inspects several environment variables. REQUEST_METHOD has the method used, PATH_INFO shows the base URL called, QUERY_STRING has

[FIG 3]

```
POST /cgi-bin/hello.pl HTTP/1.1
...headers here
username=whatever
otherfield=othervalue
...etc
```

[FIG 4]

```
#!/usr/bin/perl
$methodused = $ENV{'REQUEST_METHOD'};
print "Content-type: text/html\n\n";
print <<ONE;
<HTML>
<HEAD>
<TITLE>This page generated by Perl</TITLE>
</HEAD>
<BODY>
<h3>Thank you for submitting this form.</h3>
<p>The method used was: $methodused
<p>The path info is:
<p>$ENV{'PATH_INFO'}
ONE
if ($methodused eq "GET") {
$whatwassent= $ENV{'QUERY_STRING'};
}else{
$contentlength = $ENV{'CONTENT_LENGTH'};
read(STDIN,$whatwassent,$contentlength);
}
print "<p>Before translation, this was sent:";
print "<p> $whatwassent";
$whatwassent=~ tr/+/ /;
$whatwassent=~ s/%([a-fA-F0-9][a-fA-F0-9])/pack("C", hex($1))/eg;
print <<TWO;
<p>The translated query string or posted data is:
<p>$whatwassent
</BODY>
</HTML>
TWO
```

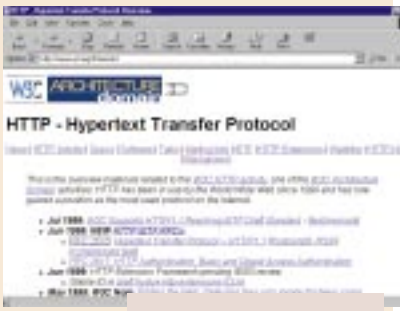
CONNECTING TO A WEB SERVER

You do not need a web browser to connect to a web server! For example, you can connect to a web server with Telnet and type in the request directly. If you do this with the Windows Telnet client, check Local Echo in Terminal – Preferences so you can see what you are typing.

To connect, specify the target host name (a name or an IP address) and the port number, usually 80. You can do this in the Telnet client's connect dialog, or from the command line: Telnet localhost 80. This assumes you have a local web server running. If not, choose a valid host name. To get a response, type a valid request and complete it by pressing Enter on a blank line. For this to work, you have to be an accurate typist as correcting mistakes with backspace usually will not work. Note that the request is case-sensitive. For example, try:

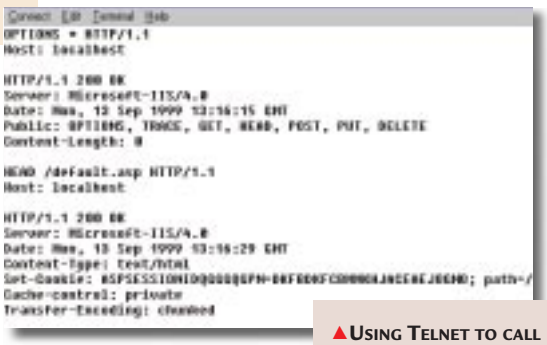
```
GET / HTTP/1.1
Host: localhost
```

not forgetting to send a blank line at the end. All being well, you should receive the default home page of the web server running on your PC as pure HTML.

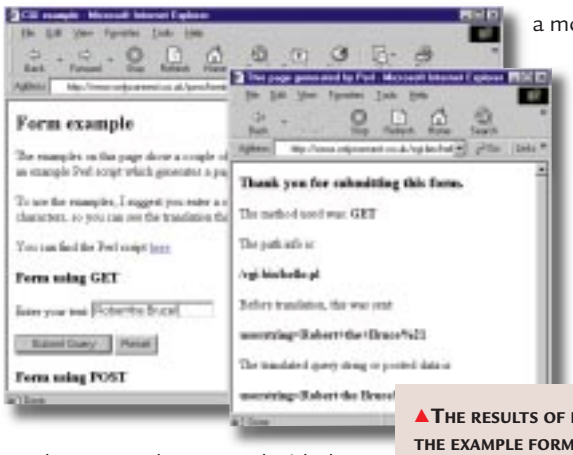


▲ GET ALL THE HTTP OFFICIAL SPECIFICATIONS FROM WWW.W3.ORG

The point of this exercise is to get a lower-level glimpse of what is going on between the browser and the web server. It can also be handy for debugging. And it lets you try out some of the other methods, like OPTIONS and TRACE.



▲ USING TELNET TO CALL A WEB SERVER WITHOUT USING A BROWSER. THIS LETS YOU TRY OUT METHODS LIKE OPTIONS AND HEAD



▲ THE RESULTS OF RUNNING THE EXAMPLE FORM AND PERL SCRIPT SHOW WHAT HAS BEEN RETRIEVED FROM THE REQUEST METHOD

supplementary data passed with the URL and, in the case of POSTed forms, CONTENT_LENGTH enables you to read the data from STDIN.

The script in Fig 4 also shows the form data before and after translation. Using the example form, try entering values with spaces, slashes or other awkward characters. You don't have to use Perl: any language that can read and write from standard input and output will do. C, C++ and Delphi will do this easily. There is housekeeping here that is well suited to object-oriented wrapping. If you are using Perl, the answer is to use a module called CGI.pm. This creates a handy CGI object with any parameters translated for you and placed into an array. It also helps in generating HTML for the response and with getting and setting cookie values.

Delphi users have another option. If you have the client-server edition, you can use the web application wizard, which builds a skeleton CGI application. The inner workings of HTTP are wrapped in several objects, including TWebModule, TWebRequest and TWebActionItem. However, you are limited in Delphi to Windows-based web servers.

Other kinds of web application

It's worth learning about CGI for the insight it gives into what happens when you click Submit on a form button. A common criticism of CGI is that it begins a new process for every script instance, but whether or not this matters depends on how busy the site is likely to be.

There are ways around it. For example, the mod_perl extension to Apache embeds the Perl interpreter into the web server, so scripts run in the same process.

Microsoft's first answer to the problem is ISAPI, an API that lets you write extensions to Internet Information Server (IIS) as DLLs. They are loaded only once, when they are first called, and run in the same process as IIS. A twist in IIS 4.0 is that the loading of ISAPI extensions can be delegated to a COM Web Application Manager object, running in Microsoft Transaction Server. In this case, ISAPI DLLs can run either in-process or out-of-process, but in both cases they are still loaded once only. It is a matter of compromise between protecting IIS from buggy ISAPI extensions and achieving maximum performance.

The second Microsoft solution is ASP (Active Server Pages). There are two clever things about ASP. First, it lets you write HTML pages with scripts that execute partly on the client and partly on the server. Built-in objects encapsulate key elements such as Request and Response. Second, it lets you instantiate COM objects and work with them. We will look more closely at ASP next month.

PCW CONTACTS

Tim Anderson welcomes your web development queries and tips, via the usual PCW address or at webdev@pcw.co.uk

- *You can find RFC 2616 at www.w3.org. I have also posted a copy at www.onlyconnect.co.uk/pcw/rfc2616.txt*
- *Get CGI.pm from www.perl.com*

Given Alpha chance

Andrew Ward unravels the mysteries of FX!32 and unearths a way to change CD drive letters.

Readers frequently ask how to get hold of Compaq's FX!32. You can get it from www.digital.com/amt/fx32/fx-download.html but not everyone wants to do a 17MB download. Fortunately, Graeme Clarke has come to the rescue and notified me of a UK systems house that will happily send out FX!32 for the price of a blank CD and return postage.

For those who don't know FX!32, it's a means of executing 32bit x86 applications under NT4 on a Compaq Alpha processor, so Alpha owners can run a lot more software under NT.

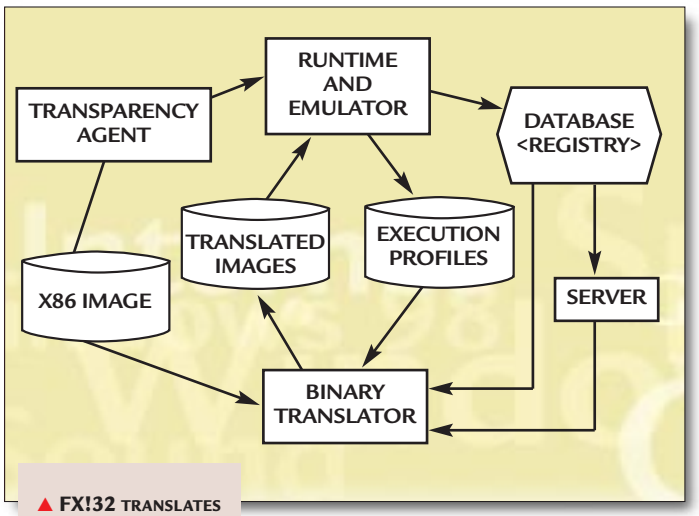
FX!32 supports high-level Win32 software, but not low-level non-Win32 software such as device drivers or debuggers. There is a list of applications known to work with FX!32 at www.digital.com/amt/fx32/fx-testapps.html but check the read-me file for the quirks of individual applications.

Execution speeds are comparable to a high-performance x86 system. Compaq is continually improving FX!32 and the latest version, 1.5, loads x86 programs faster and uses a new floating-point model to improve x86 compatibility and performance.

To run FX!32 1.5 on your Alpha, you need Windows NT Alpha 4 with the Alpha Service Pack 5 and Microsoft Internet Explorer 4.01 or higher – both can be obtained from the Microsoft website. Microsoft is expected to include FX!32 with Alpha versions of Windows 2000.

There are two main components to FX!32 – the background optimiser and the runtime emulator. FX!32 works as follows. When you first run an x86 application, FX!32 develops a profile that is later used to translate parts of the application to native Alpha code. Successive runs of the application will gradually exchange more and more of the application's x86 instructions for native Alpha instructions until, eventually, little of the application is actually run in the emulator.

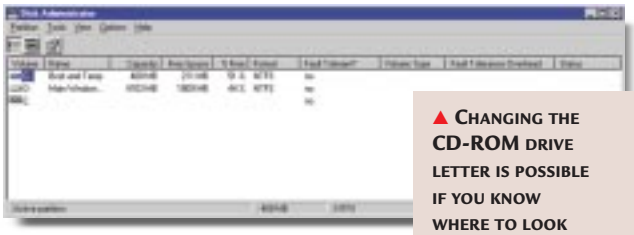
The background optimiser applies optimisation techniques similar to those used by modern compilers to achieve its high performance, including global optimisations, value propagation, common sub-expression elimination and scheduling.



▲ **FX!32** translates x86 code into native Alpha instructions for fast execution

However, at the time of writing, Windows NT support for the Alpha processor appears to have come to an end, following the news that Compaq laid off about 100 engineers responsible for developing Windows NT on the Alpha platform. Many or all of them were employed at the former DECWest facility that had worked for several years with Microsoft on NT kernel, clustering and 64bit support.

Microsoft confirmed that 32bit versions of Windows 2000 for the Alpha would cease at release candidate 2, and the 64bit version will founder too, owing to the lack of Compaq support.



▲ Changing the CD-ROM drive letter is possible if you know where to look

■ CD-ROM drive letters

Melanie Rhianna Lewis asks whether it's possible to change the CD-ROM drive letter in Windows NT, as you can in Windows 95 and 98. The answer is yes, but it's not surprising that many people aren't aware of this because it's well hidden. You have to run the Disk Administrator (which you will find under Start/Programs/Administrative Tools) but even then it's not obvious, because in the default Disk Configuration view you don't get to see the CD-ROM drive at all and can't change it.

So, you have to select Volumes from the View menu, and you should then see a display like the one in the screenshot below. If you highlight the CD-ROM drive, under the Tools menu the option Assign Drive Letter should no longer be greyed out. If you get an error when attempting to change the CD-ROM drive letter, that's possibly because it's in use by some application in the system. If you can work out what it is, close it down or terminate the process and then try again.

However, you should be careful when assigning drive letters because a lot of software makes reference to a specific letter. If you installed any applications from CD-ROM, they have probably remembered the original drive letter, so when you add or remove modules in future you may have to browse manually for the drive. If you have the time and are feeling brave, you can search for references to the old drive letter within the registry and manually change them there.

When you add new drives to the

▲ THE WINDOWS NT4 NETWORK WIZARD HOLDS YOUR HAND THROUGH THE INSTALLATION PROCESS

system, hard disks or CD-ROM drives that have had letters specifically assigned to them via the disk administrator will not be affected. Otherwise, you could find that your drives move around, disrupting your applications.

Joysticks

Going back to joystick driver installation, Melanie also says you can avoid installing the service pack after the joystick drivers by in[redacted]rvice pa[redacted]ce pack to a[redacted] the fo[redacted]ng [redacted] you will be able to install the latest drivers directly from that location. This technique would work for any other upgrade or installation – just direct the NT installation program (for example, the Network control panel) to use the service pack files instead of the original CD. This will only work where the necessary files have been updated by a service pack, but I think virtually all of them have.

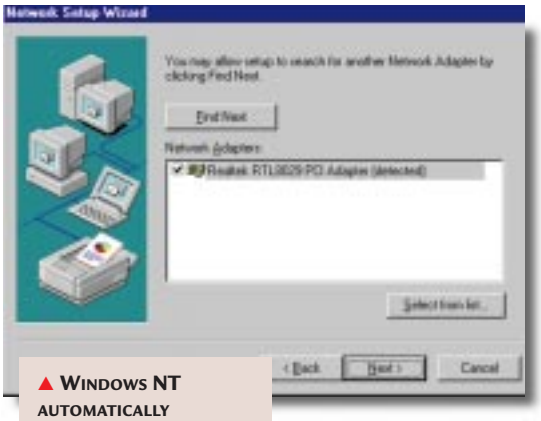
Networking

Robert Lewis asks how to network two systems running Windows NT, to allow his laptop to use the printer and tape backup drive attached to his desktop machine and to share files between the two.

Adding networking capabilities to NT4 is easier if networking wasn't configured when NT was first installed, because then you can use the wizard. Otherwise, you have to reconfigure it manually via the Network control panel.

When installing Windows NT, network configuration can be avoided by selecting Do Not Connect This Computer To A Network At This Time. Then, at a later date, when you select the Network control panel, you'll receive the message: 'Windows NT networking is not installed. Do you want to install it now?' Answering Yes will cause the Network Setup Wizard to be initiated. Remember, you will need administrator privileges in order to perform network installation.

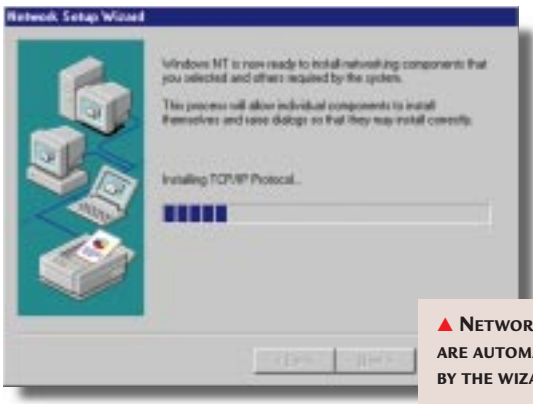
The first step is to specify whether you are using remote access or are wired to the network, and in this case the default selection of being wired is the correct one. The next screen (*right*) causes Windows NT to automatically search for your networking adaptor, and usually this will be the correct procedure. If that doesn't do the trick, you will have to provide a disk with the appropriate device driver.



▲ WINDOWS NT AUTOMATICALLY SEARCHES FOR YOUR NETWORK ADAPTOR

Next comes the thorny issue of choosing the network protocol. These days, the default setting is TCP/IP, and since this is now the universal standard networking protocol there's no particular reason to choose any other if you're simply linking a couple of NT machines. Alternative protocols you can use are NWLink IPX/SPX Compatible Transport and Microsoft's own NetBEUI.

As standard, Windows NT will select at least the following four services for you: RPC Configuration, NetBIOS Interface, Workstation and Server.



▲ NETWORKING COMPONENTS ARE AUTOMATICALLY INSTALLED BY THE WIZARD

Unless you have a specific reason to include any others, that's all you'll need at this stage.

Unfortunately, the Network wizard will default to copying the necessary files from your floppy drive – unlikely to be the correct option. To access the files from your Windows NT CD-ROM instead, you'll have to enter the drive letter manually because there's no Browse... button. Type in D:\ or whatever, and the software will automatically switch to the correct CD-ROM folder D:\i386\.

You may be presented with dialog boxes raised by the adaptor driver itself, but these should be self-explanatory.

The wizard will ask whether it should obtain an address from a DHCP server. Unless you have an ISDN router or similar device for internet access, it's unlikely that you'll have an address, so answer no.

For TCP/IP networking, you have to specify an IP address and subnet mask. If you don't know what this means, don't worry. Choose the IP address 192.168.1.1 for one system and 192.168.1.2 for the other. (If there are more, they can be 192.168.1.3 and so on.) For the subnet mask, specify 255.255.255.0, which is not the default. Addresses within the class B network 192.168 are some of those that have been reserved for private use in this way – they are guaranteed not to conflict with any public addresses on the internet.

These settings are made under the IP Address tab of the Microsoft TCP/IP Properties dialog. You won't need to change the Advanced settings or anything under

the other tabs, although I always turn off Enable LMHOSTS Lookup on the WINS Address tab. If you leave it turned on and someone fiddles with your LMHOSTS file, you can end up with horrendous remote domain access problems that can prove difficult to diagnose.

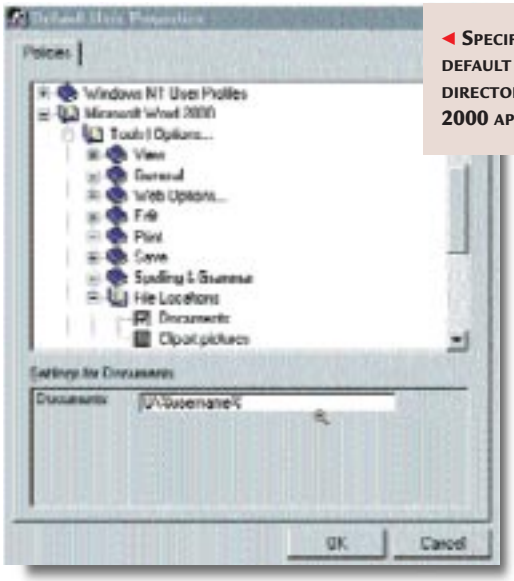
When you click OK, you'll receive a warning that at least one of the adaptor cards has an empty primary WINS address. Ignore this warning and click on Yes to continue. You'll be presented with a complicated-looking Bindings screen, but you can ignore it and press Next to continue. It is possible, by removing some bindings and changing the order of others, to achieve a small performance improvement, but it's not worth worrying about. It's also possible to stop things working properly.

On the next screen, specify that the computer is to be a member of a workgroup rather than a domain (we don't have a domain controller in this example). You can change the name of the workgroup from the default of Workgroup if you like, but you'll only have to remember what you changed it to. Most people don't bother.

Now you'll have to restart the system and re-apply the latest service pack. Repeat the procedure with the other system(s) on the network, changing the IP addresses of course.

That establishes a network, but we still have no means of file or printer sharing. To share a printer, find it via Explorer/Printers, right-click on the printer name and select Sharing... from the drop-down menu. Change its status from Not Shared to Shared and choose a suitable name.

When you add a printer to the other systems on the network, you can specify that the printer is remote rather than attached locally and that it should automatically browse for and discover any shared printers out there – assuming that the user permissions are correct. If security isn't an issue but usability is, simply set up user accounts on both machines for all users, with the same user name and password. You will then never have a problem accessing resources across the network.



◄ **Specifying the default save directory for Office 2000 applications**

You can access a remote drive in its entirety by using Tools/Map Network D[redacted] menu. For the path[redacted] remote machine nam[redacted] drive letter with a $ sign, [redacted] map drive C: on machi[redacted] type in:

[redacted]

If you want to share specific folders, find them with the Explorer, right-click on the folder name and select Sharing... from the menu. Choose a suitable name and restrict the number of concurrent users and their permissions, if you wish. In a simple network environment such as the one we're discussing, such settings aren't usually important.

That really is about all there is to it. For taking tape backups of the notebook system over the network to the desktop, on the desktop you would map the notebook drive to a spare drive letter. You need to do this before running NTBACKUP or other tape backup software, or it won't see the mapped drive. Then proceed just as you would when backing up a local drive. Note that with NTBACKUP, you won't be able to back up the registry of the remote machine (a subject covered in some depth previously in this column).

If you have already installed networking, perhaps if you use dial-up networking to connect to the internet, you'll have to go to the Network control panel and add your network adaptor card under the Adapter tab. The automatic search won't work, so add the adaptor manually. You will probably have the TCP/IP protocol installed and Windows NT will bind this to the new adaptor. With an internet connection, your IP address is probably determined automatically, but for the local network, you'll have to specify one manually.

Adding networking to NT4 is easier if networking wasn't configured during installation

Home paths

On the subject of default home directories for users' application data files, Neil Syborn points out that in Microsoft Office, you can dictate the default save path using a system policy file. For Office 97 the file is called Off97nt4.adm and for Office 2000 it's Office9.adm.

The mechanism works slightly differently in each case. For Office 97, you can make one setting that applies to all Office applications (alternatively, you can also specify different settings for each application). For Office 2000, you have to specify the path for each application individually.

These template files are supplied along with the Office Resource Kit, which is downloadable over the web. For Office 2000, the file that includes the System Policy Editor and associated templates is ORKTools.exe, a 9MB download. You can find this and the files for other Office versions at www.microsoft.com/office/ork/.

To apply the new templates (which, incidentally, are automatically installed to your systemroot\INF folder), run the Policy Editor and choose Options/Policy Template/Add.

In Neil's case, drive letter Q: is mapped to the shared user directory. Each user has a subfolder called after their username, so they use the policy setting Q:\%username% to force the use of each user's directory by default.

PCW CONTACTS

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Siamese Systems 01525 210053
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The need for speed

Mark Whitehorn digs out his old Psions to see how far they've come since the dark ages.

There I was, minding my own business, when I was suddenly struck by a strong desire to quantify how much faster the Psion 5mx is than its predecessor. There was no reason for this fancy, it was just a piece of passing whimsy. Then I thought: 'Of course, it would be interesting to compare those speeds with the 3mx.' And then: 'What about the 3a?' Before I knew what I was doing, I had dragged out the entire range of Psions from their dusty dens. Some of them needed new batteries but they all fired up.

The only problem was finding a benchmark that would run on them all. Some form of demanding worksheet? No, the original Psion 3 doesn't have a spreadsheet – I'd forgotten after all this time! But OPL has been there since day one, so I used the program in Fig 1.

[FIG 1]

```
PROC Penguin:
Local X,T1,T2
T1=minute
T2=second
Print T1,T2
X=1
Do
      Print "hello ↙
      world",X,second
      X=X+1
Until X=1000
Print T1,T2,minute,second
Beep 40,40
Pause 500
EndP          (Key: ↙ code string continues)
```

This simply writes a line of data to the screen 1,000 times and then writes start and end times to make it easier to work out how long the test took.

When you REM out the

```
Print "hello world"
```

line, you discover that the execution times plummet – which strongly suggests that this test mainly measures how quickly the machine handles the screen. That's fine, because screen handling is a crucial function in a PDA, but to test the processor more directly I also ran the same code 100,000 times without the Print line. The results speak for themselves [Fig 2].

[FIG 2]

Machine	Write 1,000 statements	Perform 100,000 increments	Processor
3	149	231	3.84MHz, 16bit
3a and 3c*	150	139	7.68MHz, 16bit
5	50	51	18.432MHz, 32bit
3mx	44	42	28MHz, 16bit
5mx	27	13	36MHz, 32bit

* The 3a and 3c performed identically. Since the screen and processor specs are identical for these two, this seems perfectly reasonable.

The 3 is lamentably slow by today's standards, but using it again reminded me what a great design it is. I was also impressed that despite being eight years old, mine still runs and is perfectly usable. The 3a/c can process data much faster, but handles the screen at about the same speed.

This is unexpected until you remember that the screen of the 3a/c has four times as many pixels, so it looks better but is much harder to drive. The 5 is about three times faster than the 3a/c and the 3mx is a tad faster again, but the 5mx blows all the others into the weeds. So, in both cases, the mx version performs much better than the standard version – and to such an extent that the 3mx outperforms the standard 5.

I wouldn't claim for a minute, rolled over or not, that these tests are definitive (*see boxout on Psion time, below*), but they do provide some indication of performance. Now, if only WinCE machines came with the same sort of language, we could do cross-platform comparisons...

Speed and the FBI

....which we can't. On the other hand, some of the new WinCE machines really burn rubber. The Cassiopeia E-100 has a 130MHz MIPS processor; it also can display up to 64K colours. What can you possibly do with all that horsepower? Go fishing, of course.

In the October issue, I wrote about John Kennedy's Sticky Buttons. He has now come up with an extension called

PSION TIME

Minute is a built-in OPL function that returns, from the system clock, the number of minutes past the hour. Second does likewise for seconds. The programmers among you will have noticed that my mechanism for capturing the time is potentially flawed. Imagine that the system clock has been set at 1:34:59.99999999999. T1 gets the value 34 and then T2 gets 00 because, in the interim, the clock has flipped over to 1:35:00. Unlikely, but possible. It didn't matter for my timings because I would have noticed the one minute error, but if you want to use the same kind of timing mechanism in a program where it does matter, you can program the potential error out by using something such as Fig 3.

[FIG 3

```
Do
   Hold = second
   T1=minute
   T2=second
Until Hold = T2
```

If the minute rolls over, as described above, the loop forces another pickup and all is well.

FBI, which stands for Fish-Based Interface. At first glance, FBI simply appears to turn your palm-size WinCE device into a fish tank. You can sit it in its cradle on your desk and be soothed by the passing and re-passing of piscatorial exotica, gently blowing bubbles on-screen.

Tap once anywhere on the screen, however, and each fish acquires a name: not Zebra Fish or Angel Fish, but Calculator and Calendar. Double-tap on a fish and the application opens – these fish are really icons.

This is, of course, a silly way to design an interface because occasionally, the fish/icon that you are desperately seeking swims off the screen as your pointer homes in on it and you must await its return. But if you wanted an ordinary interface, you wouldn't be tempted to try something called FBI, would you? The rest of us can enjoy its amiable fishy wackiness. I already have it installed.

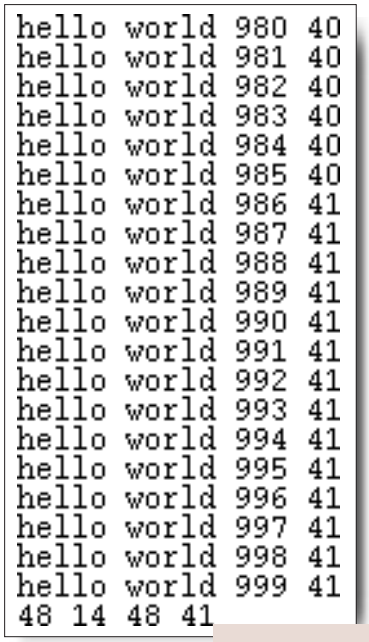
Indications that the vast bulk of available processing power is being used by the FBI is apparent when you use the Start menu – the performance is somewhat sluggish. This is a minor criticism (more of an interesting aside, really) because as soon as you move to another application, the FBI is no longer visible and the processor is freed up.

Fishing for files

John also supplies a further application that fills a long-felt want. Tools have always been available on a PC, right back to the DOS days, for navigating directory structures to locate files.

To my surprise, Windows CE devices don't come with an explicit file browser. The argument appears to be that you've bought a commodity item and that users of commodity items neither want nor need to know where their files are. I disagree and, happily, others seem to agree with my disagreement as browsers are turning up from third-party suppliers – such as Sticky Explorer. Details of this and John's other apps can be found on www.sticky.co.uk.

◀THE TIMING CODE ABOUT TO RUN ON THE 5MX...



▲...AND THE RESULT, 27 SECONDS LATER

An alternative, which applies to both Psions and CE devices, is to fire up the internet browser and use that to explore your file structure – but this, of course, presumes that your PDA has browser software. Jason Mees has pursued this line and writes:

'I have recently discovered how to show the Psion Series 5's file and folder structure, including memory size and date, via the Psion web browser. As long as the web browser from the message suite has been installed, all you need to type is:

```
file:///C/
```

'This then brings up folders and files on the C: drive. Clicking on a folder (which acts as a hyperlink) opens up another screen, although only .mbm, .jpg, .gif and .htm files can be opened and accessed directly.'

GPS

On the subject of exploration (OK, this link is extremely tenuous – sorry) you may have noticed my propensity for writing about GPS (Global Positioning Satellite) units. If you have a unit that failed to proceed towards the end of August, the enjoyment you get from reading this will depend on where you threw it in disgust.

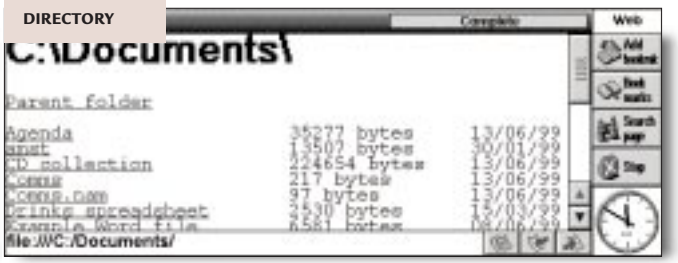
News coverage at the time reported that the re-setting of satellite clocks to zero was causing some GPS units to fail, but didn't include the more heartening information that it may be possible to recover a failed unit.

My four-year-old Garmin 45 did indeed die, but was resuscitated by holding down the Page key and keeping it down while turning the unit on, then releasing both keys. The Garmin then downloads a new almanac from the satellites, a process that takes upwards of 40 minutes, so check your batteries are fit for the task before you start. Happily, the 45 doesn't dump its waypoints during this operation.

For details of how to reset any other Garmin model, check the site at

▼USING THE WEB BROWSER TO SHOW THE FILES ON THE PSION. YOU CAN EVEN DOUBLE-CLICK ON THE NAME OF A SUBDIRECTORY SUCH AS DOCUMENTS...

▼...TO OPEN THAT PARTICULAR DIRECTORY



www.garmin.com or the site of your manufacturer. Not all GPS units can be brought back to life, but it's certainly worth checking the web if you have a deader. So, did you hurl it out to sea or cast it to the bottom of your sock drawer?

Another deader?

Wyndham Hollis <Wyndham@compuserve.com> emailed me about the LG Phenom Express. In fact, he forwarded an email from the LG technical support department, which states unequivocally that the machine will cease to be manufactured in the US and that there is no replacement in the pipeline.

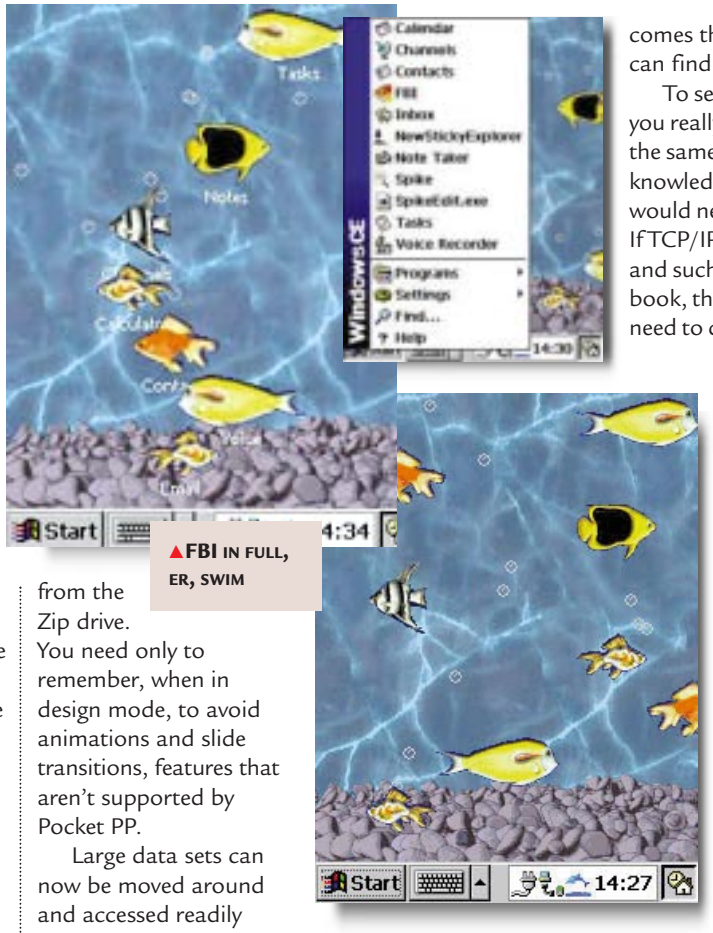
LG is not a big name in the PDA world and one wonders if it hasn't been edged out by the likes of Hewlett-Packard and Casio as competition in the WinCE market becomes ever more fierce. The Phenom Express is a machine that I consider to be somewhat better than the bulk of offerings and I am saddened if this signals its untimely demise.

Expanding Windows CE devices

I reviewed two products in the November issue of *PCW*: the Adaptec SlimSCSI 1460, which is a PC Card Type II SCSI adaptor, and the Xircom CompactCard Ethernet 10, a network card for Windows CE devices. I described them, explained what they were like to install and use, and concluded that they were both fine, upstanding products. What I could not discuss in those short-format reviews is that they both open up whole new ways of working with a WinCE device.

The Adaptec SCSI card allows you to attach a Zip or Jaz drive to a handheld WinCE machine; I attached an Iomega 250MB Zip drive to an HP Jornada 820. The drive can, of course, be used for backing up, which is a thoroughly worthwhile and valid use, but a world of other possibilities also open up.

You can, for instance, create a huge and impressive PowerPoint presentation on your PC, save it to the Zip drive and set off for the conference burdened with merely the Jornada and the Zip drive. On arrival, you connect the Jornada to a monitor or projector (so you might want to pack a cable for that too) and deliver a presentation to the accompaniment of your sophisticated PowerPoint slides, accessed by Pocket PowerPoint from the Zip drive.



▲FBI IN FULL, ER, SWIM

You need only to remember, when in design mode, to avoid animations and slide transitions, features that aren't supported by Pocket PP.

Large data sets can now be moved around and accessed readily from a handheld, opening up new ways of using that data. The possibilities are manifold: copies of CD-ROMs (you can fit several on a 2GB Jaz drive), the complete company database, images by the score... whatever you need.

And while I hate to eulogise, the Xircom network card is, for me, an even more revolutionary step in WinCE usability. Connectivity between PDAs and PCs is problematical, but it is also essential for the synchronisation of agenda and contact details, and for moving files between the two machines.

Psion devices seem to generate my biggest headaches, although WinCE connectivity is certainly not without its grim moments (see the November column). The Xircom card does away with all this grief and strife at a stroke.

Fitting the CompactCard lets me plug instantly into the existing network infrastructure, which in turn allows me to use tried and trusted protocols for communication between the PC and the WinCE device. All the cable-waving and hair-tearing is bypassed. It's wonderful, it only costs £89 and I love it. Here comes the only 'but' I can find.

To set up the card, you really need to have the same level of network knowledge that you would need for a PC. If TCP/IP, IP addresses and suchlike are a closed book, then you will need to do a bit of background reading.

This particular network card, just like the SCSI card, has changed the way I work. For example, I keep an archive of all my articles in a directory structure on a fileserver and now I can plug the Jornada into the network, use the web browser to navigate to a particular file and double-click on it. Pocket Word opens the document and it's ready for editing. The high level of file compatibility between Office and Pocket Office makes more sense when you can do this sort of thing.

Whether the CompactCard is for you depends entirely on your individual circumstances. So, if you've already beaten PC-PDA connectivity into working order, know absolutely nothing about networking and don't want to wade into a whole new world of cables, configuring cards, protocols and the like, then please feel free to disregard the latest love of my life.

If you have networking experience, however, then setting up the card and using it is as easy as falling off a log. Speaking as someone with a network at home (how sad) and with a deep-seated loathing of serial cables and their ilk, I fell off a log and I am laughing.

PCW CONTACTS

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Samba step by step

Chris Bidmead sways to the beat of the SMB file server emulator, and attempts a spot of filing.

The application that is doing more than any other to shift Linux into Windows sites is Samba, the SMB file server emulator conceived in Australia by Andrew Tridgell. Like many of the other components contributing to the roaring success of Linux, Samba isn't specifically a Linux application at all – it belongs generally to the world of Unix and free software.

SMB stands for System Message Block, the Microsoft network protocol underlying LAN Manager and NetBios. SMB's ubiquity owes more to Microsoft's marketing clout than engineering excellence, and its implementation in products like Windows 9x and Windows NT is inconsistent and buggy, presenting interesting hurdles for its implementers.

▲ THE SAMBA SUITE ALSO INCLUDES A WEB-BASED FRONT END, SWAT (SAMBA WEB ADMINISTRATION TOOL) FOR CONFIGURING THE /ETC/SMB.CONF FILE

Samba is a collection of programs. The core of the suite is smbd, the Samba daemon that runs on a Unix system to provide file and print services to SMB clients such as Windows or Windows NT. The way the daemon operates is defined in a file called /etc/smb.conf – smbd and smb.conf each have their own separate manual pages. There's also a special utility called testparm, designed to test and report on your /etc/smb.conf setup. Another utility, smbstatus, reports on current use of the SMB server.

A second daemon, nmbd, is there to provide support for NetBios-style name-serving and browsing, so the machine running Samba can respond to network browsers such as the Windows Network Neighbourhood. Again, this daemon has its own manual page.

Samba isn't specifically a Linux application – it belongs generally to Unix and free software

Smbclient is a utility that works as an ftp-like client to an SMB server, which may be Samba or a Windows machine of some kind. In addition to providing a way for a Unix machine to access directories shared using the SMB protocol, smbclient can be set up to allow a Unix machine to print to a printer attached to the SMB server. Man smbclient will give you more details.

But often you want something that works more like NFS, allowing you to mount remote SMB shares. Two European programmers, Paal-Kr Engstad and Volker Lendecke, resourcefully kludged together a utility called smbmount for the purpose, and until recently this separate effort was distributed as part of the Samba package. Current Samba distributions offer an equivalent function by extending smbclient with a rewrite of smbmount which calls on a helper program called smbmnt, each of which has its own man page.

Where do all the files go?

A frequent theme in your emails is bafflement about the way Unix lays out its files. Dick Stuart-Grenville writes that, after working with Windows: 'I find it difficult to come to terms with a different file system, which encourages the re-use adlib of directory names such as /etc – I can never be sure I'm looking in the right place.'

Well, there is only ever one /etc, although there may certainly be other directories called etc buried deeper (an interesting one is /home/ftp/etc which is designed to appear as /etc to anyone logging in by anonymous ftp). The Unix philosophy for laying out standard files and directories is not too defined, and a lot of the detail varies between different versions. The Red Hat Linux system is built around an initiative called the Filesystem Hierarchy Standard (FHS). This was formerly known as the Linux Filesystem Standard (FSSTND), but it was expanded to take in members of the BSD community and now aims to offer a standard file system hierarchy for all Unix-like operating systems.

Root, or / is the root directory at the very top of the directory tree. It belongs to root (the super-user), who is the only one allowed to store files here.

Under modern Unixes, no files are stored here. The root directory exists simply as the anchor point for all the other directories.

Don't confuse / with /root (although some older Unixes did just this). /root is the directory off the root that is used as the super-user's home directory.

☛ **/bin** contains the essential executables. It should be immediately accessible in single-user mode because its components are required to bring up the system or repair it. The same applies to /sbin, the distinction being that the /sbin executables won't usually be needed by ordinary users.

The Linux Filesystem Standard now aims to offer a standard for all Unix-like systems

☛ **/dev and /proc** are 'strange' directories, a function of the Unix philosophy of making everything look like a file. The 'files' under /dev are actually drivers for a whole range of devices or, strictly speaking, funnels that connect these drivers to the system. For example, on Linux systems, /dev/fd0 is the device that accesses the floppy disk drive. Be aware, though, that these /dev files offer only low-level access to their respective devices, which brings us to...

☛ **/mnt**, the home of the mount points. If you want to write files to (or read files from) a floppy disk, you will first need to mount it. That is to say, the raw device as represented by /dev/fd0 will have to be incorporated into the file system. You do this by creating a mount point (which is exactly the same as creating an empty directory), for example, /mnt/floppy, and attaching it to the appropriate device with a command such as:

mount /dev/fd0 /mnt/floppy.

Officially, /mnt is described as 'a mount point for temporarily mounted filesystems', but more usually you will be mounting on arbitrarily created directories below /mnt. For example, /mnt/cdrom is the standard place to mount a CD-ROM. For a temporary mount I tend to create a mount point under /tmp.

☛ **/proc** is an even stranger and much newer concept than /dev. The 'files' under /proc are manifestations of the running system (or an 'interface to kernel data structures', as the proc man page officially puts it.) For example, if you type out the text file /proc/meminfo to the screen thus: 'cat /proc/meminfo', you'll see something similar to Fig 1.

[FIG 1]

	total:	used:	free:	shared:	buffers:	cached:
Mem:	31387648	28807168	2580480	32976896	614400	12759040
Swap:	45379584	3944448	41435136			

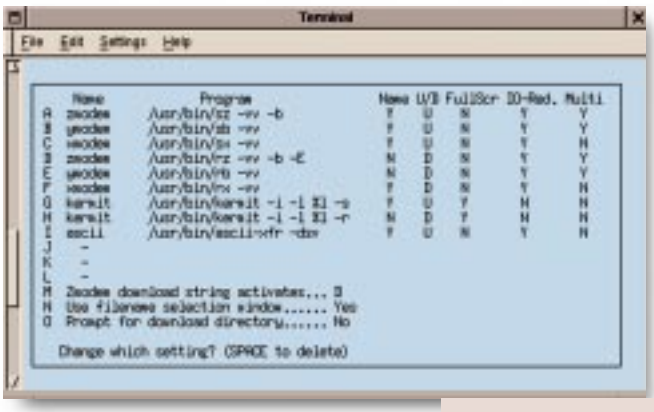
MemTotal:	30652 KB
MemFree:	2520 KB
MemShared:	32204 KB
Buffers:	600 KB
Cached:	12460 KB
SwapTotal:	44316 KB
SwapFree:	40464 KB

Other key directories are /var (used for files of uncertain length, like log files; /tmp (temporary files); and /home (under which the home directories of the ordinary, non-super-users are located).

A particularly important directory, to revert to Dick's original question, is /etc. Here, or in directories below /etc, all the system's configuration files are stored. Hence /etc/hosts is the file that keeps tracks of the names and TCP/IP addresses of all the machines on the local network.

Older Unixes took the directory's name literally and used it as a general repository for system scripts and other oddments. Linux is attempting to shake off this stubborn tendency and follow the rule that /etc should house only configuration files, not executables. Some of the key differences between, say, SuSE Linux and Red Hat Linux hinge on the extent to which this rule has been followed.

That should give you some feel for the Unix directory structure. I hope it has whetted your appetite for fuller details which you'll find in the Linux man pages under man hier. If you want the complete story, you can read the full FHS documentation at, for example, www.pathname.com/fhs/2.0/fhs-toc.html.



▲ FIG 2 MINICOM'S OPTIONS LET YOU SPECIFY WHICH UTILITIES WILL BE CALLED WHEN YOU EVOKE THE VARIOUS SERIAL TRANSFER PROTOCOLS. THE INTEGRATION IS SEAMLESS, BUT MINICOM DOESN'T COMPLAIN IF A REQUIRED UTILITY DOESN'T EXIST

More on that router

As I told you last month, the ZyXel router I put on top of the Altec-Lansing sub-woofer succumbed after a couple of hours to the powerful magnetic field around the unshielded speaker. I concluded that it must have fried the router's Flash RAM – but only after the same thing happened to a second ZyXel router. I figured that if the contents of the Flash RAM had been munged, I should be able to reload them by going through the Flash update procedure. Unfortunately, I made a mess of this too.

Uploading firmware is carried out through the router's serial port. Under Linux (and this works with most Unixes), I used the free software serial

◀GNOMBA IS ANOTHER SAMBA ACCESSORY, WHICH YOU'LL NEED TO DOWNLOAD SEPARATELY FROM HTTP://GNOMBA.DARKCORNER.NET. IT BROWSES THE NET FOR SMB SHARES AND SIMPLIFIES THE PROCESS OF MOUNTING THEM UNDER THE LOCAL FILE SYSTEM

communication program called minicom, which was originally put together by Miquel van Smoorenburg. I needed to run minicom as root to match the default permissions on /dev/ttyS0 (or I could have changed the permissions). I set the baud rate to the default baud rate of the router's serial port and logged into the router's menuing system, confirming I had a connection.

But all attempts to upload the firmware failed. I set up the router to receive the xmodem stream and minicom was giving me a growing string of dots on the screen as if the upload were in progress. But the string of dots just went on growing... for hours.

If I'd known minicom better, I would have realised much earlier that I didn't actually have an xmodem connection.

It turned out the dots were minicom's way of twiddling its thumbs while it waited

Despite what the minicom upload menu leads you to believe, minicom doesn't actually do xmodem. Or ymodem, or zmodem. Eh? What kind of serial comms utility is this?

Actually, it's a damn fine one. It turned out that the dots were minicom's way of twiddling its thumbs while it waited for the xmodem connection to be established – by some other utility. If I'd taken the trouble to explore minicom a little, I would have discovered a setup screen that establishes which utility is going to take care of which protocol.

You'll see from the menu [Fig 2, previous page] that xmodem uploads and downloads are supposed to be handled by /usr/bin/sx and /usr/bin/rx respectively. Inspection of the /usr/bin directory revealed that I didn't have either of these utilities installed. And locate couldn't find them anywhere else, either.

You can, of course, change the menu to point to whatever serial connection utilities you feel like using. But there were none on my system. I went back to the Mandrake installation CD and discovered lrzsz-0.12.20-3mdk.i586.rpm. Running rpm on the package with the -qpi switch (similar to the -qi switch we discussed last month, but with an extra -p because the package is not yet installed) revealed a note that said: 'If you're installing minicom, you need to install lrzsz.'

I would be embarrassed to tell you how long I spent with minicom before I discovered why it wouldn't upload the Flash code. In the meantime, I'd been on the phone to Paul McGeever, business development manager at Electronic Frontier, the distribution company that took over the handling of ZyXel gear from P&L Systems.

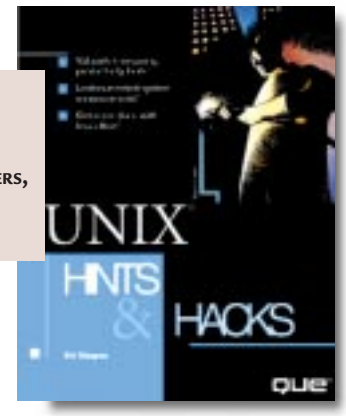
He arranged to come round and sort me out with a new version of the ZyXel router – the Prestige 100IH, which also includes a four-port 10BaseT hub. So, together with an eight-port InBusiness hub, I now have plenty of spare capacity on my network. And I'm back on the internet.

Unix Hints and Hacks

There are a lot of dud Unix books out there, but *Unix Hints and Hacks* by Kirk Waingrow (Que) is a worthy tome.

The title is a little misleading. The book is a collection of real-world wisdom from users who have evidently lived through the trials and tribulations of administrators on a traditional multi-user Unix site (the author runs the Unix Guru Universe site at www.ugu.com).

This sounds – and, indeed, is – a far cry from the typical Linux home user who has to be both user and administrator rolled into one. I've read Unix admin books that are decades out of touch and if my mail bag is anything to go by, so have many readers of this column. But in *Hints and Hacks*, Kirk has achieved a remarkable feat. The book is firmly anchored in real-world multi-user Unix and covers a multitude of valuable generalities (and tricky specifics) that make it a must-read for anyone running a Unix system, particularly for the Linux beginner who's looking for a wider horizon and a closer acquaintance with the real stuff below the GUI.



▶'UNIX HINTS & HACKS' IS A MUST-READ FOR ANYONE, INCLUDING BEGINNERS, RUNNING A UNIX SYSTEM

PCW CONTACTS

Chris Bidmead welcomes your comments on the Unix column. Contact him via the PCW editorial office or email ***unix@pcw.co.uk***

Unix Hints and Hacks *by Kirk Waingrow is published by Que, price £18.49 and is available now. ISBN: 0789719274*

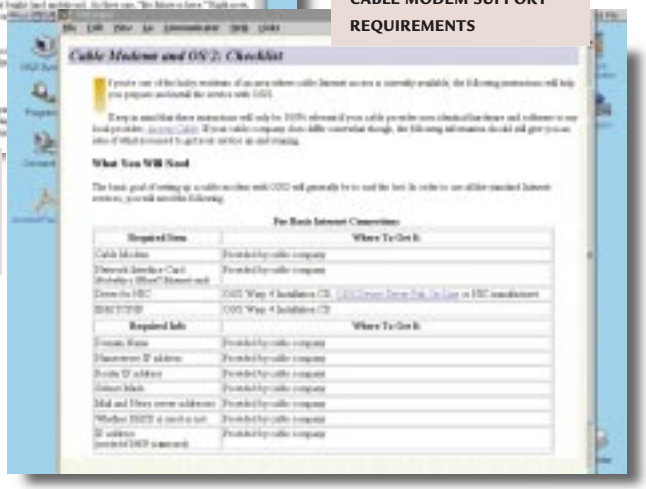
Cable and unwilling

Terence Green struggles with the intolerance of cable modem providers and the IBM helpdesk – again.

Users of OS/2 are sometimes overlooked when new technologies emerge. Quite often, OS/2 can support the technology, but the people who deliver it live within the Windows monoculture, which leaves them blind to other operating systems, even though they could be equally effective.

The recent flurry of free ISPs is a case in point. As we've discovered, it's a doddle to connect with Warp even though many ISPs only support Windows. We can do this thanks to the shift from proprietary networking protocols to TCP/IP, which Warp has always supported.

▲OS/2 AND CABLE MODEMS – WILL THEY OR WON'T THEY WORK TOGETHER?



▼A CHECKLIST FOR WARP CABLE MODEM SUPPORT REQUIREMENTS

Now it's about to happen again, as cable companies finally deliver the cable modems they've promised. NTL has an internet service via cable modem for £30 per month. The service is asynchronous, offering 'up to' 512Kbit/sec downlinks and 128Kbit/sec uplinks.

Reader Nigel MacLeod, an NTL cable subscriber, received a letter from NTL inviting him to partake of the new service, but NTL only supports Windows 9x and Nigel is a staunch OS/2 user. So Nigel is looking for cable modem information. One place to look would be the OS/2 networking newsgroups, where cable modems have long been discussed. For anecdotal information, have a look at www.os2ezine.com/v2n10/cable.htm

The good news is that the standard connection for cable modems is Ethernet and TCP/IP, both well supported by OS/2. If the cable modem is an external box with an Ethernet connection, you're in luck. Your main obstacle will be the cable company's stipulation that you have a Windows PC. You could get around this by providing a Windows PC when the engineer calls and transferring the details to your Warp PC once they have done their job and departed. In most cases, getting a cable modem to work with OS/2 will be a re-run of the free ISP situation, where it was a tortuous process to locate the logon details and the addresses of nameservers. Note, however, that USB and PCI cable modems are also in production and may not include OS/2 drivers.

If you're in the market for a cable modem, you should also consider BT's Asynchronous Digital Subscriber Line (ADSL) service, which will be rolled out in metropolitan areas such as London, Birmingham and Leeds over the next few

PPP DIALLER UPDATE

George Szaszvari wants to know whether Warp 3 can be used with ISPs that only support PPP connections. He recently brought his copy of Warp 3 out of retirement to see if it would provide a more reliable internet connection than Windows. But then George hit a problem: the Warp 3 Dial Other Internet Provider won't connect to his internet service provider, Pipex, as it no longer supports SLIP connections.

The original DOIP code released with Warp 3 in 1994 has some problems with PPP, which was not widely used at that time. However, there is a PPP update for DOIP, released in 1995, which should solve the problem. The update can be found at ftp://ftp.ibm.net/pub/PPP/ as PPP.ZIP. It's a 0.5MB download. In order to use it, first install the Internet Access Kit from the Warp 3 Bonus Pak, then install the files from PPP.ZIP to update the DOIP software.

Full installation instructions are in the enclosed README.PPP file. Be sure to follow the installation instructions to the letter in order to install the update.

months. ADSL also connects to a PC via Ethernet and TCP/IP and, like cable modems, offers a permanent, fast internet connection. The service may cost about £40 for an equivalent bandwidth to that offered by NTL for £30 – 512Kbit/sec down, 128Kbit/sec up – but BT's prices are yet to be confirmed.

Support act

Dave Bailey wrote to agree with the consensus that IBM doesn't offer a very helpful face to the individual OS/2 user. Dave says that when he contacts IBM for OS/2 support, he 'just gets passed around a number of people who know the same amount about OS/2 – nothing'.

Dave's query wasn't particularly esoteric. He had upgraded his hard disk to a new 6.4GB model, which triggered a 'partition mapping may be corrupted' message. As Dave discovered by reading the *Hands On* OS/2 column, the problem arises because the original Warp hard disk driver isn't aware of multi-gigabyte hard drives. The solution is simple – an updated driver that IBM provides in the IDEDASD.EXE file, which can be downloaded from the OS/2 Device Driver Pak Online.

The problem was that no-one at IBM was able to point Dave in this direction. They referred him to the HelpFax line, which turned out to be constantly engaged, and even offered a support contract at one point. But Dave says: 'Luckily, the person I was put in touch with had the sense to realise that a contract costing hundreds of pounds was not what I was looking for.'

This isn't very good, but it is in line with the message we have begun to repeat every month. OS/2 has excellent support from both the online community and from IBM – as evidenced by the regular Fix Packs, device driver updates and Netscape and Java developments – but individual Warp users are not favoured customers any more. To get support, you have to tap into OS/2 online through the Usenet newsgroups OS/2 hierarchy (try comp.os.os2.* as a search word) or via one of the OS/2 websites maintained by enthusiasts.

Alternatively, you can read the OS/2 *Hands On* column! This is especially recommended if you don't have a good internet connection, a situation I now understand all too well. This column comes from the southern tip of Africa, where the maximum connect speed is 19.2Kbit/sec. Downloading even the smallest file is a pain. As a result, we will try harder to deliver Fix Packs, plus Netscape and Java updates, whenever space permits!

NETSCAPE 4.61 AT WARP SPEED

By the time you read this, Netscape Communicator 4.61 for OS/2 Warp should be available for download. IBM put up the first preview (read this as 'beta') version in July and a second one in August. We hope to be able to place it on the *PCW* cover CD in due course, but you might want to go ahead and download it anyway if you can face the 7MB-odd download.

▲ NETSCAPE COMMUNICATOR 4.61 FOR OS/2 WARP – AVAILABLE NOW

Netscape 4.61 for OS/2 Warp includes the Navigator browser, Messenger email and news, and Composer HTML editor. The preview version supported the latest OS/2 Warp Java 1.1.7 runtime and development environment, but IBM has since shipped Java 1.1.8 and that will also be supported in the shipping version. Netscape 4.61 brings Warp users bang up to date with the latest Netscape browser developments, including SmartUpdate, HTML 3.2+, What's Related and JavaScript 1.3. More details can be found at www.ibm.com/software/os/warp/netscape/.

The ongoing development of OS/2 browsing and Java services is fully in line with IBM's positioning of the Warp client (actually, both Warp clients, as Java 1.1.8 and Netscape 4.61 support Warp 3 and Warp 4) as a premier network client. An interesting article in the daily WarpCast www.warpcast.com identifies IBM's Java 1.1.8 for OS/2 as the top performer in the SciMark 2.0 Java benchmark. Results and the chance to test your own system online can be found at http://math.nist.gov/scimark2/index.html.

Although we rightly bemoan the lack of direct end-user support for Warp, it's instructive to compare it with competing desktop operating systems. These grow like Topsy, gather ever more fluff, become increasingly complex to maintain and require ever more desktop resources, sometimes for no apparent purpose other than to prevent folder animation from slowing to a crawl.

By contrast, Warp 3, first released in 1994, can be brought right up to date with the latest Java and browsing functions. As the SciMark results show, older CPUs powered by Warp Java (available from www.ibm.com/java) can deliver performance in excess of the latest CPUs, as they struggle to cope with the load imposed by less efficient Java virtual machines.

PCW CONTACTS

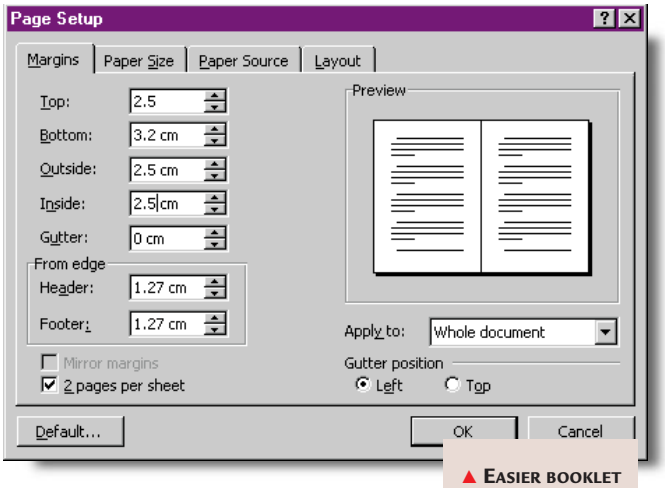
Terence Green welcomes your feedback on the OS/2 column. Contact him via the PCW editorial office or email: os2@pcw.co.uk

Going by the booklet

Tim Nott puts his pages in order with A5 printing tips and assigns Word Pro keystrokes

One long-standing problem that frequently figures in this column's mail is how to make A5 booklets in Word by printing pages 'two-up' on A4 paper. The core of the problem is what is known as imposition – getting the pages in the right order. In the simplest case, a single A4 sheet folded, pages 4 and 1 need to be facing on one side of the sheet with 2 and 3 on the other. An eight-page booklet goes 8-1, 2-7 and 6-3, 4-5. More pages and I have to scribble on bits of scrap paper to work it out. We've looked at various solutions, including macros, tables, feeding the paper through four times and using commercial add-ons such as Clickbook.

The good news is that Word 2000 seems to have got this right – nearly – as there is an option in Page Setup for two pages per sheet. First, you need to set the orientation as landscape on the Paper Size tab, then switch to Margins and check the '2 pages per sheet' option. Then set your margins. For some peculiar reasons, these are reversed on my setup: changing the measurement in the Inside box alters the outer margins and vice versa. Having set up the page, you create your document with normal page numbering.



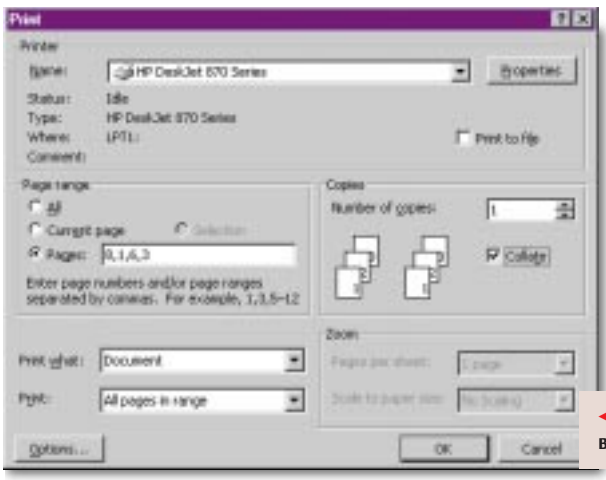
▲ EASIER BOOKLET PRINTING IN WORD 2000

Now comes the clever bit. Let's assume we're printing an eight-page leaflet and you have a standard single-side printer. Go to the Print dialog and, in the Page Range options, select Pages, type 8,1,6,3 in the box and then set the number of copies you want. Print, and you'll find pages 8 and 1 are on the first sheet, with 6 and 3 on the second. Repeat the print run on the other side of the paper for pages 4,5,2,7 (assuming the 8-1 pages are now at the bottom of the stack). Your paper path – and hence the order – may vary, but this works on my DeskJet.

The good news is that Word 2000 seems to have got this right – nearly

For those still labouring under the yoke of Word 97, the following (fiddly) method fulfils the essential condition of preserving an editable text stream.

First, set up the page as landscape, with two columns. Make sure you have text boundaries visible from Tools, Options, View, then use the column outlines as guides to draw two text boxes – these will hold the body text. Next, draw two more small text boxes in suitable positions to hold the page numbers. Using your preferred copy and paste technique, create sufficient additional blank pages for the entire booklet, then manually number these as they will be printed, eg 8-1, 2-7 etc.



◀ PRINTING THE BOOKLET - SIDE ONE

Now copy and paste your previously prepared text – all of it – into the text box on the right of the first sheet, which should be marked as page 1. Obviously, it won't all fit. Right-click and choose Create Text Box Link. This 'loads' the cursor with the excess text: click in the text box designated as page 2 to fill that, then repeat the linking for the rest of the pages. Print using a variation of the 'Pages' technique above – remember that these will be the sheet numbers, not those that appear in your booklet.

Word Pro hotkeys

A while back, I asked if anyone out there knew a way to assign keystroke shortcuts to actions in Lotus Word Pro. A deafening silence ensued and then the originator of the enquiry, Alan Hitchin, supplied the answer himself. You can assign CycleKeys or styles to the function keys from File/User Setup, but this isn't very flexible – you can't, for example, mix the two or assign other key combinations. What Alan wanted was to get his favourite AmiPro shortcut keys back, such as Control + D to swap between full-page and 100 per cent zoom. The answer, it seems, involves editing the registry. So, with the usual caveat of making sure you have a recent registry backup (see *Hands On* Windows passim), here's what you do: first, record

Questions & answers

Q I am constantly saving news stories, technical reports and reviews from the internet. The problem is the space formatting of the text cut from a web page. If I want it to fill a normal A4 page economically, I am faced with the long task of highlighting spaces and deleting them. Microsoft Word 97 solves this problem with Autoformat, but I cannot seem to do this with Lotus Word Pro.

CHRIS ANDERSON

***A** Using the spacebar as a formatting aid is a relic of steam typewriting, and I agree, it's annoying. One thing worth a try is choosing Paste Special from the Edit menu, then selecting RTF as the format (if available). In Word Pro 9, this seems to strip out extra spacing as it pastes. There is a similar feature to Word's Autoformat (Edit, Proofing Tools, Check Format), but this only seems to check for double spaces – it ignores three or more. The following method lacks elegance, but is a lot less effort than manual editing.*

Open the Find & Replace toolbar and type two spaces in the Find box, then one space in Replace. Hit the Replace All button, and a message appears telling you how many replacements have been made and asking whether you want to close Find & Replace.

Click on No, click on Replace All again, and repeat these two steps until the message shows zero replacements. The final step is to get rid of any single spaces at the beginning of lines. Type ^r in the Find box, followed by a space. Type ^r in the Replace box, with no trailing space. Replace All and the job is done.

Q Recently, I had to re-install Windows 98. Afterwards, I discovered that I had lost all my AutoCorrect entries in Word 97 – both the installed ones and the ones that I had created. Can I get them back? And if not, how do I re-install the AutoCorrect entries that came with Word 97?

DAVID STEWART

***A** For reasons I cannot fathom, Word 97 keeps these in .ACL files in your Windows folder. Normally, there's a generic one plus other, user-specific ones. You need to back these up before deleting the Windows folder prior to a clean re-install. Re-install Word to get the standard ones back.*

Q Maybe things have changed in Word 97, and I'm no expert, but in Word 95, under Windows 95, your macros to launch external programs from Word (*Hands On* June and September 1999) consistently fail with syntax errors.

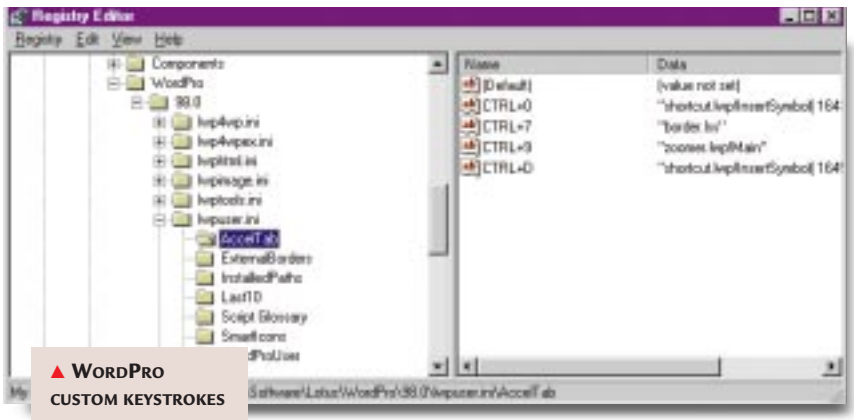
In any case, your placement of commas and spaces is unclear and inconsistent. If you are going to publish code, you need to establish a symbol to stand for 'space' so as to avoid confusion.

DR ERIC WEBB

***A** Things have indeed changed. The macro code you mention was written in Visual Basic for Applications (VBA), which comes with Word 97 and 2000. Word 95 and earlier uses WordBasic, which is a different dialect – sorry if I didn't make that clear.*

With regard to the spaces and commas, it's always a problem to reproduce code in narrow columns, because of the necessity to wrap long lines. An arrow symbol at the end of a printed line indicates that the code string continues onto the next printed line. We use a monospaced font, so it should be obvious where the spaces are.

Having said that, there was a slight glitch in September's example as an extra space somehow crept in at the end of the fourth line.



▲ WORDPRO CUSTOM KEYSTROKES – NOT EASY, BUT POSSIBLE

or write the scripts to carry out the relevant commands, then close Word Pro.

Run Regedit and go to:

HKEY_CURRENT_USER\ Software\ Lotus\ WordPro \9?.0\lwpuser.ini

(the question mark is either 6, 7 or 8). If there is no key here called AccelTab, create one. Under this key, create (in the right-hand pane) new string values for each shortcut key you want to define. The name should be in the form of Alt or Ctrl followed by +, and then the key, with no spaces eg Alt+D. Double-click on the new name to edit its value and type in the name of the script. If it isn't in your default scripts folder you'll need to include the whole path. If the script is a freestanding .LSS file you just type in the name. If it's in a document (.LWP) file, type in the name of the document, followed by an exclamation mark, followed by the name of the script – no spaces. Close Regedit, open Word Pro and your assignments should be in effect.

On a related matter, my copy of SmartSuite Millennium came with a document (Shortcut.lwp) that allows you to assign keystrokes to insert symbols. This stores the information in the same place in the registry – note that you need to copy the document to your Scripts folder for the assignments to work.

PCW CONTACTS

Tim Nott welcomes your comments on the Word Processing column. Contact him via the PCW editorial office or email wp@pcw.co.uk

Match-making

Stephen Wells discovers the difference between the approximately true and the exactly false.

The following people: Kevin Allan, Clive Burt, Tony Cowling, Sam Edge, J Mcilroy, Mike Petrie and Geoff Wyss, to name a few, have been kind enough to comment on my use of a combination of the INDEX and MATCH functions in the September column instead of using VLOOKUP.

Initially I responded to these correspondents by saying that the VLOOKUP function required the data to be sorted into ascending order. But some readers replied that VLOOKUP has a fourth optional argument. If it's omitted or entered as TRUE then VLOOKUP finds an approximate match, but if entered as FALSE the function will find an exact match. So instead of using

```
=INDEX(G1:H10,MATCH ↙
(B2,G1:G10,0),2)
```

you can use the simpler formula

```
=VLOOKUP(B2,G1:H10,2,FALSE)
```

where cell B2 holds the value to be looked up in the first column of the table; G1 to H10 is the range of the table, and 2 is the column number in the table where the match is sought.

What is interesting is Microsoft's development of the function. I'm used to arguments being handled differently between the same-named functions in Excel, 1-2-3 and Quattro Pro. But this is the first case I've come across of Excel improving a function between versions. With Excel 4, Microsoft included three excellent manuals to which I frequently refer. In the Function Reference, VLOOKUP has three arguments and it says that if VLOOKUP can't find a lookup value, it uses the largest value that is less than or equal to the lookup value. Yes, I do have Microsoft Press' *Excel 97 Worksheet Function Reference* but, at £22.99, it's not as comprehensive as the free Excel 4 version of the same book. But now that I look at this newer book again – and double-check with the Excel 97 Help file – it's true that VLOOKUP has sprouted this fourth argument. And it's not to keep up with Lotus and Corel as 1-2-3, 97 and Quattro Pro 8 still use

```
@VLOOKUP(X,RANGE,↙
COLUMN_OFFSET)
```

Microsoft's Works 4.5 also retains the three-argument version of VLOOKUP.

Although Microsoft recommends in several articles in the Knowledge Base, even for Excel 2000, that it is safer to use the INDEX/MATCH combo over LOOKUP, or VLOOKUP to allow for all eventualities, I give equal weight to the opinions of readers using Excel for everyday tasks.

What's that name?

Bill F Hamilton, who uses Excel 5, wrote to ask if I knew the VBA vocabulary to write a macro which would display the Name of the range which contained the active cell. My level of expertise here is like the schoolboy with enough French to say that his aunt has a pen in the garden.

[FIG 1] Macro to find names

```
Sub Find_Names()
For Each n In ActiveWorkbook.Names
 On Error Resume Next
 If Mid(n.RefersTo, 2, InStr(n.RefersTo, "!") - 2) = _
  ActiveSheet.Name Then
   Set y = Intersect(ActiveCell, Range(n.RefersTo))
    If TypeName(y) = "Range" Then MsgBox "Cell is in : " & n.Name
 End If
 Next
 MsgBox "No More Names"
End Sub
```

After I failed Bill, he got back to me with the answer to share with other readers. The macro is listed in Fig 1. How it works is illustrated in Fig 2. In my example cells A2 to A13 are named Months. I have created a button on the worksheet to start the macro and labelled it Names. Here the active cell is A7.

When you click the button, a dialog box appears which says that the active cell is in the range labelled Months. When you click OK in the box, another appears that says No More Names because, in this instance, there are no more applicable Names. Cell A7 could, of course, be in several named ranges at once. In that case the macro would display each Name in turn. This macro works in Excel 5 and any later version.

Timely tips

It's wise to include on an invoice the date by which payment is expected. That's easy if the period of agreed credit

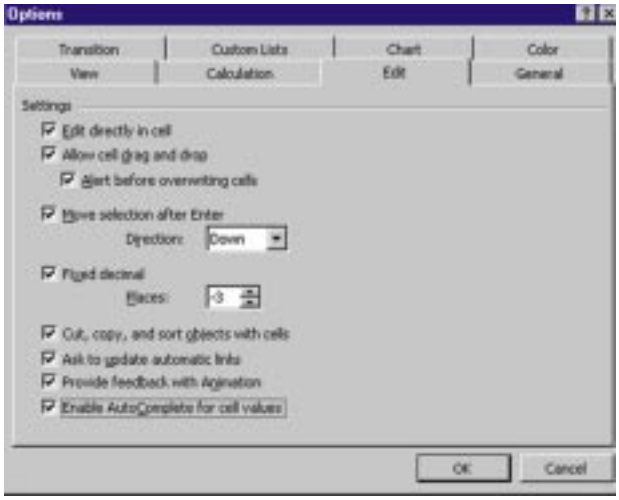
IT'S THE WEEKEND

It can be cheering to have a topical message pop up on your worksheet. In Excel, enter `=IF(WEEKDAY ↙ (NOW())=6, ↙ "Hooray, it's ↙ Friday!","")` and on the last day of the working week the message will appear. To remind you to keep that cell clear on the other days, you could have an anodyne phrase such as, 'Keep striving' between the final quotes. In Lotus 1-2-3 the equivalent formula is `@IF(@ ↙ WEEKDAY (@NOW)=4,↙ "Hooray, it's ↙ Friday!","Keep ↙ striving")` as Monday is counted as zero and Sunday as six. In Corel Quattro Pro, the formula is the same as 1-2-3, except the four becomes a six as in Excel, which counts Sunday as one.

Questions & answers

Q How can I have Excel add zeroes automatically to my entered numbers? For instance, if I enter 23 I want Excel to store and display 23,000.

A *Choose Tools, Options, Edit and check Fixed decimal (see right). Then in the Places box select -3. Then format the cells as a Number, with a comma for a 1,000 separator.*



Q What's the fastest way of moving columns or rows around in Excel?

A *In Excel 97 or 2000, select the column or columns you want to move by clicking on the column letters. Move the mouse pointer to the edge of the selection until it changes from a cross to a regular pointer arrow. Hold down Shift and then click and drag the column to the new position. A faint 'I' bar which runs the entire length of the column shows you where the column(s) are going. Release the mouse button before releasing the Shift key, and the column is moved without overwriting any data. If you do wish to overwrite other data, then don't use the Shift key. You can move rows the same way by clicking on the row number(s) first.*

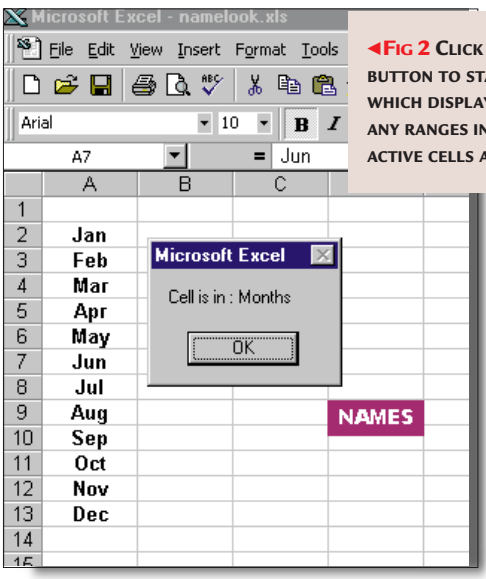
Q When we're calculating the production of orders we often end up with percentage points like 98.63 sets. Obviously .63 of a set is no good to anybody. And Excel makes things worse by rounding more than half a set up to another whole one. How can I just display the number of fully completed sets?

A *Use the ROUND DOWN function. If you have 98.63 in L23 then in L24 enter =ROUNDDOWN(L23,0).*

Q Sometimes the SUM of a column of figures on a spreadsheet is obviously slightly wrong. What is happening?

A *Spreadsheets display an entered or calculated stored value according to the selected or default formatting. In Excel you might like to go to Tools, Options, and select Calculation Precision as displayed. But when you do this Excel permanently changes any constant values on the worksheets in the workbook. If you later choose to calculate with full precision, the original underlying values cannot be restored.*

One solution is to use the ROUND function with a number argument (any number that you want rounded) and a num_digits argument (the number of digits to which you want the number rounded). So ROUND(10.46,0) and ROUND(10.46,2) display 10, but ROUND(10.46,1) displays 11 because Excel has independently rounded the .46 up to .5. For peace of mind, just with formatting, you can display a lot of decimal places to check what is happening.



◄FIG 2 CLICK ON THE NAMES BUTTON TO START A MACRO WHICH DISPLAYS THE NAME OF ANY RANGES IN WHICH THE ACTIVE CELLS APPEARS

is given in days. All you need to do is add the number of days to the issuing date with a formula like =B2+C2 in cell D2. That's because spreadsheets store dates as a number which is a count of days since a start date, such as 1-1-1900.

But supposing the issuing dates of the invoices are in column B and column C has the number of months of credit extended. This may vary due to a number of factors. In column D the DATE function can pick up the year, month and day from column C and add the number of months to be added to the date specified in column C.

In Microsoft Works and Excel the formula is:

```
=DATE(YEAR(B2),MONTH(B2),↙
DAY(B2)+C2)
```

Drag this down the column. Format column C as numbers and columns B and D as dates. The equivalent formula in Lotus 1-2-3 and Quattro Pro is

```
@DATE(@YEAR(B2),@MONTH(B2)+C2↙
,@DAY(B2))
```

(Key: ↙ code string continues) although this only works as long as the total number of months doesn't exceed 12 – the maximum number of months these two spreadsheets will recognise. They don't 'carry months forward' as Excel and Works do.

PCW CONTACTS

Stephen Wells welcomes your comments on the Spreadsheets column. Contact him via the PCW editorial office or email spreadsheets@pcw.co.uk

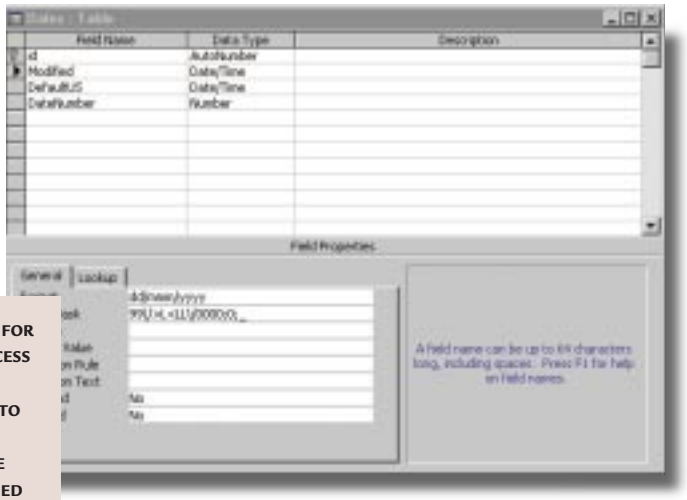
◆ *Please do not send attached files unless they have been requested.*

Microsoft masquerade

Mark Whitehorn plans to enlist Tony Blair to resolve Anglo-American differences over Access.

In the September issue of *PCW* I wearily raised the issue of the postcode and phone number input masks that Microsoft supplies for the UK. They don't work; they haven't worked since they were introduced in Access 2.

The problem keeps on tripping up new users of the product who think it is themselves who are at fault when they can't enter data. I (and I'm sure others) have repeatedly reported the problem, but it remains. When I explained the difficulty again to Microsoft US, it replied that there wasn't a problem, indeed there was a document explaining how to work with zip codes.



▶ FIG 1 A TEST TABLE FOR DATES. THIS IS IN ACCESS 97 RUNNING ON NT WHICH HAS BEEN SET TO US FORMAT IN THE CONTROL PANEL. THE FIELD CALLED MODIFIED HAS BEEN SET UP WITH THE REQUIRED INPUT MASK AND FORMAT

Undeterred, I replied that UK postcodes (and phone numbers) used a different format, and that it was the input masks supplied specifically for the UK that didn't work. In September I promised to let you know how it went.

Here is the official answer from Microsoft. A UK representative has confirmed that this isn't a UK localising issue, it's an area of Access that is dealt with in the US, which means that the UK end of Microsoft can't fix the problem. He also confirmed that the US is not replying to correspondence on this subject. However, whether this is just my correspondence, or all correspondence, is not clear.

I will be writing to Tony Blair asking for the postcodes to be changed

After some deliberation, I now realise that my whole approach to this problem has been wrong and that it is much easier to fix than I had at first thought. I will therefore be writing to Tony Blair explaining the problem to him and asking, as a matter of urgency, for the format of the postal codes and phone numbers to be changed to bring them in line with the Microsoft input masks.

Since the phone numbers are changing at present anyway, this shouldn't really be too much of a problem. I urge you to write to him as well so that we can get this matter resolved as soon as possible.

Fancy a date?

Barbara Harding <Barbara@hhcs.demon.co.uk> writes: 'On first use of my Access 97 database I realised my dates were not displaying as expected – I use medium dates to show the month in words as it is more explicit for users. The problem is that the organisation (using Windows NT) had not bothered to change the default regional settings on individual machines to British, so they were still set to US.

Of course, it is just not reasonable to expect them to update their system for my little database, so what to do? The current user says she will remember to enter dates in words, but what about when there is another user or two?'

Interesting, and the answer applies to more than just Barbara's problem.

Dates in Access (and any RDBMS) can be thought of as having three separate parts:

- Input – the bit the user types in, perhaps a series of keystrokes, for example, 2/3/2002
- Storage – the way in which the RDBMS stores the date, typically a number called a 'date value', for example, 37317.
- Output – the format in which the number is displayed back to the user, for example, 2 March 2002.

Input

In Access 97, when a field is declared to be of type date, only certain input is acceptable from the user. If you try to type in a string such as 'Hello Date Field' then it will be cruelly rejected. On the other hand, most reasonable date formats are acceptable, for example: 1/1/97, 1/1/1997, 2/3/2002, 2 Mar 2002, 2 March 2002 and so on.

Clearly, between input and storage, Access must have an interpreter that looks at a string like '2 March 2002' and turns it into a date value; in this case 37317. This particular string is unequivocal, but what about something like 2/3/2002? If you are a Brit this means 2 March 2002, but to an American this is 3 February 2002.

By default, to resolve this issue, Access looks at the settings in the Date tab of the Regional Settings in the Control Panel. If they are set to m/d/y then this date will be interpreted as 3 February 2002 and stored as 37290. If set to d/m/y then the date is interpreted as 2 March 2002 and stored as 37317.

So far so good (but see 'For your information' overleaf).

Storage

Simple. Once the date value is stored as 37317 it means, unequivocally, 2 March 2002.

Output
Access will look at the Control Panel and interpret the date value according to that setting.

All of this works fine most of the time. You have a machine set up for use in the UK and you type 2/3/2002 into a date field. Access understands this to be 2 March 2002, stores it as 37317 and displays it as 2/3/2002.

You have control.

The good news is that you can fine-tune much of this behaviour using input masks and the format properties of the field. For example, Barbara can set the input mask to be:

```
99\/>L<LL\/0000;0;_
```

This forces the user to input the date in the format: 2 Mar 2002.

The beauty of this input format is that both UK and US people understand it.

If she then sets the format for the field [Fig 1 on previous page] to be, say: dd/mmm/yyyy, it will display as: 02/Mar/2002

So, she can use a machine set to either US or UK format and provide the users with a consistent format that people on both sides of the Atlantic can understand.

SAME TABLE, SAME DATA IN EACH FIELD. THE FIRST TWO ARE DATE FIELDS DISPLAYING WITH DIFFERENT FORMATS, THE THIRD WAS ONCE A DATE FIELD BUT I'VE CONVERTED IT TO A NUMERIC TO SHOW THE DATE VALUE

Dates : Table

id	Modified	DefaultUS	DateNumber
1	23/Jan/1999	1/21/99	36181
2	23/Jan/1999	1/23/99	36183
4	03/Feb/2002	2/3/02	37290
5	02/Mar/2002	3/2/02	37317
6	02/Mar/2002	3/2/02	37317
9	02/Mar/2002	3/2/02	37317
10	03/Feb/2002	2/3/02	37290
(AutoNumber)			0

Record: 1 of 7

■ For your information

As a side issue to the above, given a machine set up in the Control Panel for UK dates, there are several other questions worth answering.

☛ What would you expect Access 97 to do with the input 3/2/2002 from a user?
Answer: interpret it as per a UK date – which is what it does.

☛ What about 30/2/2002?
Answer: reject it as a non-existent date – which is what it does. (You're getting good at this).

☛ So, what about 2/17/2002?
Answer: reject it as a non-existent date – which is what I expected but which doesn't happen. Instead it accepts it as meaning 17 Feb 2002.

Access 97 and Access 2000 running on a 'UK' machine seem to process dates as follows. If the input string can be interpreted as a UK format date, then it is. If not, but the string can be interpreted as a US format date, then this is what happens. Only if it fits neither format is it rejected.

This seems strange. Access 2, in the same situation, rejects anything that is not an acceptable UK format date. The above is based on observation; if any reader knows more, let me know.

Dates : Table

Field Name	Data Type	Description
id	AutoNumber	
Modified	Date/Time	
DefaultUS	Date/Time	
DateNumber	Number	

Field Properties

General | Lookup

Format: dd/mmm/yyyy
Input Mask
Caption
Default Value
Validation Rule
Validation Text
Required
Indexed

General Date	6/19/94 5:34:23 PM
Long Date	Sunday, June 19, 1994
Medium Date	19-Jun-94
Short Date	6/19/94
Long Time	5:34:23 PM
Medium Time	5:34 PM
Short Time	17:34

The display layout for the field. Select a pre-defined format or enter a custom format. Press F1 for help on

▲THE FORMAT PROPERTY APPEARS AS A POP-DOWN LIST WHICH SEEMS TO IMPLY THAT YOU CAN'T ENTER YOUR OWN FORMATS, BUT YOU CAN...

[FIG 2]

```
NVL(expr1, expr2). If expr1 is null,
returns expr2; if expr1 is not null,
returns expr1.
```

[FIG 3]

```
SELECT SUM(NVL(NoOrdered, 0),
       SUM(NVL(NoSold, 0),
       ( (SUM(NVL(NoOrdered, 0))-↙
       (SUM(NVL(NoSold, 0)) )
FROM TotalNoItemsSold.
```

(Key: ↙ code string continues)

■ Taking stock

Nick White <nrwhite@rac.co.uk> has contributed the following to the stock level problem, discussions about which have appeared in both the April and July 1999 issues: 'The only database I know about is Oracle, but this has a function called NVL which takes the form as shown in Fig 2 and would be used in an expression such as in Fig 3.

'If Oracle has this function I would be surprised if other RDBMSs didn't include it and to me it seems simpler than the code examples in your article.'

Access doesn't have this function but it would be perfectly possible to write it using IFF() and ISNULL(). However, an Oracle-specific solution adds a touch of class to the column and is, of course, gratefully received!

PCW CONTACTS

Mark Whitehorn welcomes your feedback on the Databases column. Contact him via the PCW editorial office, or email: database@pcw.co.uk

Calling international rescue

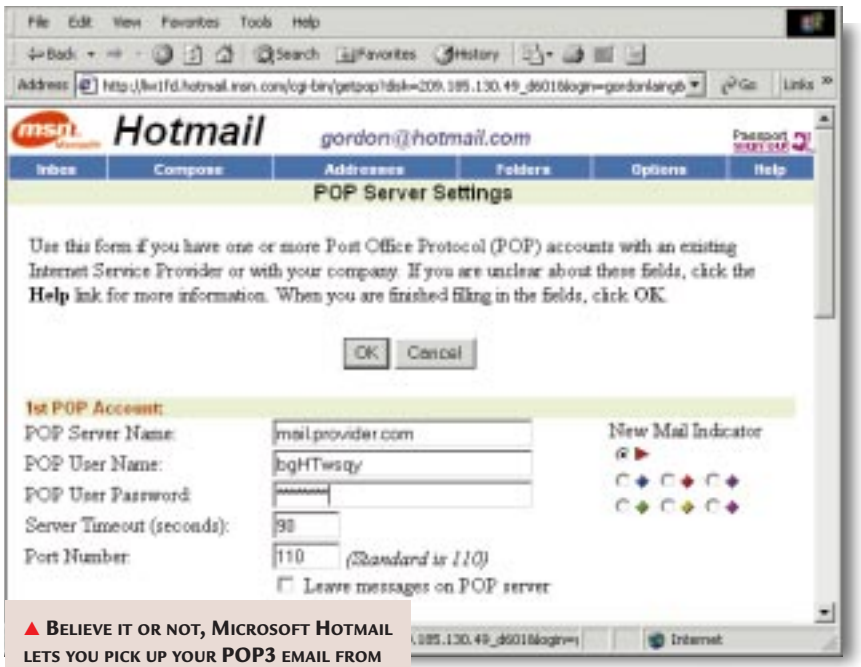
Gordon Laing takes his work away with him and finds that all roads can lead to roam.

Mobile computing may free you from the office, but it does take a bit of practice to get it right. This month's column is all about preparing your notebook or handheld for a trip away and how to get your work done once you're there.

Preparing for a trip can be as simple as copying work in progress onto your portable and continuing where you left off. Windows Explorer allows two connected systems to drag and drop files between each other easily. Most handheld PDA utilities offer similar functionality, although with typically only 8MB to 16MB built-in memory, you might have to be stingy with those big presentations.

Files are one thing, but the truly mobile traveller will want to make sure they take away the right messages and that schedules are kept up to date. This is not a one-way process, as any diary modifications or messages received while away will need to be transferred back to your main system on your return. The process of two systems exchanging information to ensure both are up to date is known as synchronisation.

Microsoft Outlook is the email and scheduling client of choice for anyone who wants to manage and update appointments, contacts and messages. Installed on a PC and notebook, it will happily compare notes and update details when both are connected. Outlook is also happy to swap information with a Psion 5 or WinCE. Full Outlook is usually required, as most PDAs don't want to synchronise with Outlook Express. On the upside, full Outlook will sync appointments and contacts along with your email in one go. Synchronising address books is also essential, as you're unlikely to remember all those obscure but vital email addresses.



▲ Believe it or not, Microsoft Hotmail lets you pick up your POP3 email from any web browser. Just enter your account details, remember to leave messages on the server, then click OK. A neat trick down the cybercafe

Knowing which files to copy and synchronise is, however, only half of the story – you'll need to get both systems connected before they can start talking. Ironically, it's easier with handhelds as they always come supplied with the correct serial cable and drivers to talk to your PC or Mac.

It is, however, worth pointing out that both Psion's and Microsoft's PDA utilities tend to hog your COM ports in their continual search for a lonely handheld. So if you're experiencing COM-rage or a mysteriously flaky modem, you should consider disabling the PDA utility in the system tray until you're ready to connect.

Why bother with wires? Virtually all notebooks and PDAs feature infra-red ports

Users of Windows notebooks have many options open to them, although several could be ruled out depending on the model and available accessories. If both systems can be connected to the same network, this is the easiest route. If you have a floppy drive on your notebook, you could copy files in 1.4MB increments, although this is slow and often insufficient. If you have a serial or parallel cable with the right plugs, you could use Windows' direct cable connection (DCC) which is located in the accessories group. However, DCC may not have been installed on both your machines, so you'll need your original Windows CD plus a ROM drive to spin it in. Suddenly, that ultra-thin floppy and CD-less notebook don't look quite so desirable any more.

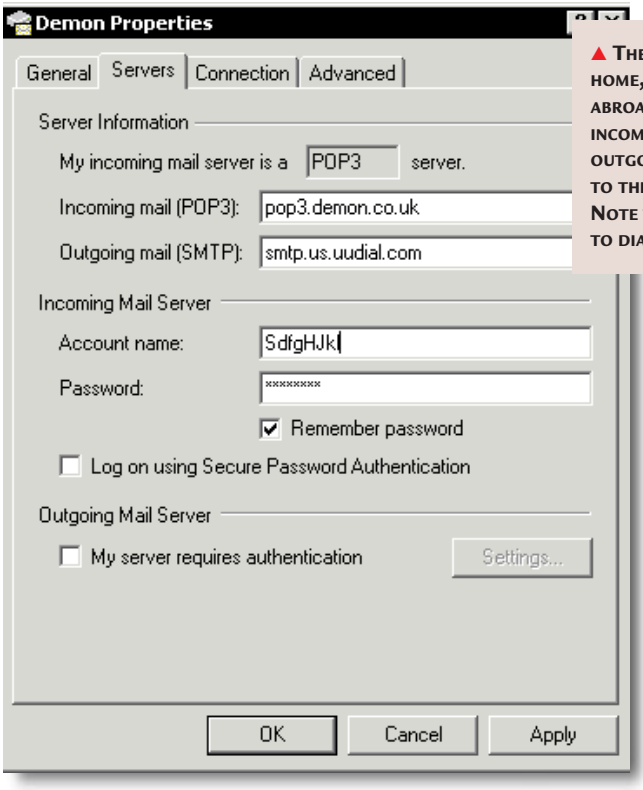
LapLink Professional does the wiring job much better than DCC and is supplied with a serial cable. It will even let you control your desktop PC remotely, which is handy if you've forgotten to bring a crucial file with you. Laplink is also the only remote access package that supports an optional fast USB connection (we had data transfer at up to 8Mbit/sec) and provides a free downloadable version for Windows CE to registered users.

Then again, why bother with wires at all? Virtually all notebooks and PDAs feature infra-red ports and Windows supports the feature directly from the

OS. It's the perfect way to communicate without the worry of installing software or remembering a cable. It's great in theory, but in practice, IR is unforgivably absent on almost all desktop PCs.

The good news is that virtually all Taiwanese motherboards feature a five-pin jumper labelled IrDA. You simply connect a suitable infra-red module, enable one of your serial UARTs to use infra-red from the Bios, and then Windows 95, 98 and 2000 will sense it and do the rest. Once activated from Windows, you will be able to connect wirelessly with your notebook or PDA and exchange data limited only by internal storage and time. Sadly, the PC's UART limits data rates to 115Kbit/sec, but it's a nice solution and a cheap one too.

Dabs Direct sells Asus IrDA modules which should work on any five-pin jumper for about £10 (see *PCW*, November 1999 issue, page 98 for a review, or search on www.dabs.com). However, most of the salespeople I spoke to hadn't heard of the device. The only problem you'll have is where to house the IR transceiver – mine's dangling gracelessly out of the front of a 5.25in drive bay.



▲ The author uses Demon as an ISP at home, and Pipex/UUNet as an ISP abroad. Demon always provides the incoming POP3 mail, but while away, the outgoing SMTP mail server is changed to the country-specific Pipex details. Note the SMTP server in this case refers to dialling UUNet in North America

You could always grab a local PC magazine and install the nearest free ISP trial

The right connections

If your modem works and you have the right cables for the country you're visiting, your hardware worries are over. If you're using a mobile phone to get online, you'll need to make sure your account has data and, if required, foreign roaming enabled. Check with your provider, too, to see if it has an agreement with a foreign network and whether there will be coverage where you intend to be.

An increasing number of mobile phones are being fitted with built-in data hardware and infra-red ports. In theory, a Windows portable or PDA should be able to use them as if they were a plain old 9.6Kbit/sec modem connected to the standard comms port. However, not all phones or PDAs behave as well as they should. Windows CE users relying on Ericsson's SH888 will need to download and install the software update at http://mobileinternet.ericsson.se/emi/Default.asp. This sets up a dedicated option for the 888 on the WinCE modem list. The site also has a patch that lets the phone work with 3Com Palm's non-standard infra-red port.

Service providers

Now you're ready to get connected, and unless you're dialling into a corporate server, your first port of call will be an ISP. All UK ISPs provide local rate 0845 access numbers, but they cannot always be dialled from abroad. Some will give you a non-0845 number to dial, but you'll incur expensive international charges. If there's no way around it, use a calling card – you can make relatively cheap foreign calls, charged to your credit card, by dialling a freephone number, then entering an account and PIN number. If this is how you want to do it, all your normal UK ISP settings will work, except that you'll need to use the +44 country code to access the UK.

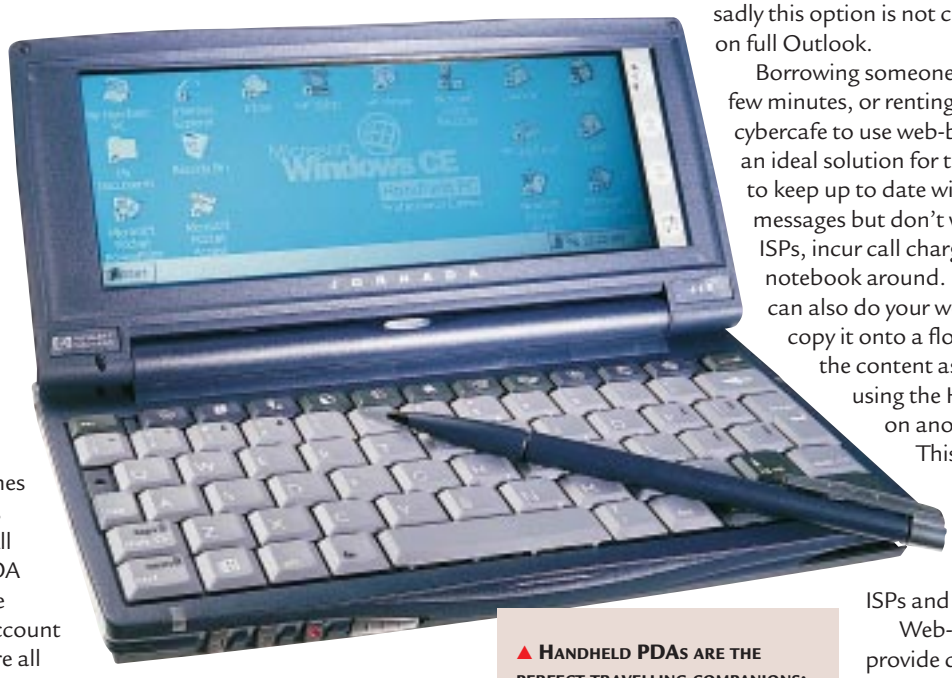
Fortunately, there is a better way. Some ISPs, such as Pipex Dial, offer global roaming facilities with local access numbers to dial around the world. Usually there is a charge for roaming, and some local settings to change manually, but otherwise it's simple and cheap. Third parties such as iPass <www.ipass.com> have agreements with a wealth of foreign ISPs and provide software to sort out your access numbers and settings automatically. You'll have to pay, but it's an easy solution for Windows and a CE version is promised in the near future.

One of the easiest routes to international roaming is to sign up with a worldwide provider such as AOL, which has local access numbers across the globe. The AOL client is easy to use in a roaming environment, although it is for Windows only – PDA users should look elsewhere. If you have a Windows notebook with a CD-ROM drive, you could always grab a local PC magazine and temporarily install the nearest free ISP trial. By the time the trial expires, you'll either be back home or setting up the next one. Remember, there's no need to be precious about the ISP you use. It's only there to connect you to the internet, at which point you can usually access your mail wherever it resides.

Incoming mail

Once you're connected to the internet, picking up your messages is quite simple. Standard POP3 accounts are easily accessed with just three pieces of information: your account username,

password and mail server address. The latter will probably be called something like mail.provider.com, while your POP username and password are normally eight randomly generated characters – not necessarily the ones you use to access your home ISP. All Windows and PDA email clients have fields for these account details and they're all you need to get hold of your POP email once you're connected to the internet.



▲ HANDHELD PDAS ARE THE PERFECT TRAVELLING COMPANIONS: SMALL, LIGHT, LONG BATTERY LIFE AND INSTANT STARTUP TIMES. THE AUTHOR WROTE THIS FEATURE WHILE AWAY WITH AN HP JORNADA 680, AND USED ITS 56K MODEM TO SEND AND RECEIVE OVER 100 EMAILS

Outgoing mail

Sending messages requires access to an outgoing SMTP server. If you're dialling directly into your home ISP, there's no need to change anything, but if you're dialling a foreign server it won't work. Fortunately, most ISPs offer an outgoing SMTP server as part of the standard access package, so just enter this address setting in your account control panel. Remember to change it back when you get home.

Lotus Notes is a special case: users should use the Notes client to dial directly into their server to send and receive messages, while those lucky enough to have Domino back at base should be able to access their information using a standard web browser.

Web-based mail

It's worth considering Hotmail or other web-based email services. Almost all of them offer access to your incoming POP3 email by entering your standard three account settings into the right boxes. They also have the facility to send messages, although they will be sent from your web account address. If someone replies to this address, you have to pick it up separately from your normal POP mail. In a strange twist of fate, Outlook Express 5 now lets you pick up Hotmail messages and read them offline, but sadly this option is not currently offered on full Outlook.

Borrowing someone's system for a few minutes, or renting time in a cybercafe to use web-based email, is an ideal solution for those who want to keep up to date with their messages but don't want to set up ISPs, incur call charges or lug a notebook around. Remember, you can also do your work on a PC, copy it onto a floppy, then email the content as an attachment using the Hotmail service on another system. This again allows you to do your work and get it home without worrying about ISPs and SMTP servers.

Web-based email can provide cunning backup too. I always send important messages or files that I'll need while away to my Hotmail account. I may have a portable with me, but if this fails or is lost, I can still get hold of my work and contacts from any cybercafe. Another good trick is to email your work to yourself as soon as it's completed, so that a safe copy resides on a remote server. This again protects you from losing your work if your notebook goes belly-up.

A quick note on sending files, though, particularly from PDAs. Most use a proprietary format by default, so when sending, say, text files, make sure you save them as something compact and compatible like an RTF.

There may be a unique set of challenges to overcome with mobile computing, but it's worth it. This entire column, along with several others, was written on an HP Jornada 680 Windows CE handheld during a week away in California. My entire office could slip into my jacket pocket and it was at my fingertips wherever I went – technology had truly set me free.

CHECKLIST FOR ROAMING

1. Files, contacts and documents – do you have everything you need?
2. Email and ISP accounts – make notes of names and passwords
3. Cables and adaptors – overseas plugs aren't like ours
4. Power – take spare batteries and remember the charger
5. Mobile phones – enable data and roaming on your account
6. Landlines – use charge cards for international calls
7. Voicemail – set up PINs so you can access your answerphone
8. Be certain – make sure it all works before leaving

PCW CONTACTS

Gordon Laing welcomes your comments on the Hardware column. Contact him via the PCW editorial office or email hardware@pcw.co.uk

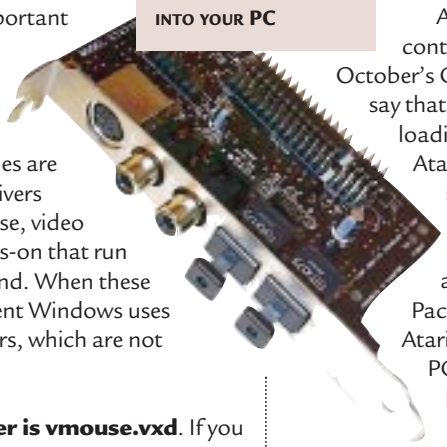
The GRM reaper

Steven Helstrip has time on his side when it comes to MIDI, and waxes lyrical over VST plug-ins.

In this month's *Sound* column, we'll be looking at ways to overcome the MIDI timing problems that can occur when playing complex arrangements. Before we get stuck in, though, it's time we caught up with some tips proffered by you, the readers.

I received an interesting letter from Andy Perring a few months back to say he was having trouble with Cubase VST and other music programs crashing unexpectedly. After re-installing just about everything he could, and moments before reformatting his hard disk, he came by some advice that seemed to cure his problems.

Andy points out that Windows 98 omits to install seven important files during setup, which can make some systems unstable. The files are virtual device drivers needed for mouse, video and other goings-on that run in the background. When these files aren't present Windows uses alternative drivers, which are not so stable.



▼Creative's Digital I/O board – possibly the cheapest way to get digital audio into your PC

One such driver is vmouse.vxd. If you take a look at the Driver File Details for your mouse in System Properties, you will notice that vmouse.vxd is in brackets, indicating that the file cannot be found. This file, along with vcomm.vxd, vdmad.vxd, vdd.vxd, ntkern.vxd and vflatd.vxd, can be found on the Windows 98 CD, in the Zip files windows98_47.zip and windows98_48.zip. Simply extract them to C:\windows\system and C:\windows\system\vmm32 and reboot. I did just that after reading Andy's letter and am happy to report that I have had noticeably fewer system crashes ever since.

David Lee has a tip for anyone who needs to get digital audio in and out of their PCs cheaply. He writes: 'In the August issue, you mentioned the new optical, digital I/O board (*above*) for the SoundBlaster Live!. Contrary to what Creative Labs is saying, this upgrade works fine with the Live! Value and not just the full-blown package. I know this because I now have one.

'Provided your Live! Value has the AUD_EXT connector, you will gain the full functionality of the board (optical and co-axial digital I/O along with MIDI input and output). Note, however, that some values only have an SPDIF_EXT connector. In such cases, the MIDI I/O will not be available. Even so, I'm sure you'll agree that £40 isn't much to shell out for the two digital I/Os that do work.'

Adrian Bradshaw contacted me after reading October's Questions & Answers to say that he, too, had problems loading Cubase songs from Atari formatted disks. He says: 'I don't have access to an ST any more, but have found a neat utility called PacifiST that lets me read Atari disks straight into my PC (*see screenshot above*). It's basically a shareware ST emulator that allows you to make an image file of any ST disk. The file can then be copied to a 'virtual hard disk', which is basically a directory on the PC. It's a bit long-winded, but it does the trick.'

PacifiST can be downloaded from http://www.fatal-design.com/pacifist/.

◄Remember that green, Atari desktop? Well, now you can have an ST inside your PC

■ MIDI timing

Much of today's computer-based music is created using a few synths or a sound card and sequencer setup. While it's possible to achieve great results with a modest setup, one thing that can ruin your efforts is poor MIDI timing. Since MIDI itself is a serial protocol, a note on/off event cannot be sent to an instrument until the previous one has been transmitted. If you have 20 MIDI tracks reciting complex rhythm patterns, juicy block chords and reams of controller data, the MIDI data path will inevitably clog up and something has to give.

If you only have one MIDI device, the problems can be more noticeable since MIDI data cannot be split over several ports to ease the load. However, a few tweaks in your sequencer can overcome most predicaments. This includes offsetting parts that are not time-critical –

▼GRM Tools could be the most exciting set of plug-ins we've seen

Questions & answers

Q In August's *Sound* column there was a piece on Cubase VST 3.7. The screenshot showed a miniMoog plug-in in which I was very interested. However, when I downloaded the upgrade it was nowhere to be found. Where can I get it from?

SIMON DAW

***A** The screenshot was supplied by Steinberg and showed the E-Type synth in early development. As you point out, this is a model of a miniMoog and, if all goes to plan, it should be released by the end of November. In the meantime, you may be interested to hear that the world's first 24bit drum machine, the LM4, is available in VST 2.0 plug-in format right now. Koblo is also planning to port its virtual synths, samplers and drum machines to this format in the not-too-distant future. For more information, point your browser at www.steinberg.net*

◀IF YOU MISSED THE SNEAK PREVIEW OF THE E-TYPE SYNTH FIRST TIME AROUND, HERE IT IS AGAIN

sounds with a slow attack, such as strings – by a few milliseconds, and prioritising the time-critical tracks. Although the following tips will go some way to resolving most timing problems, if you send more voices to your synth than it can handle, a more radical approach will need to be taken – you'll have to take out some notes!

The first thing to mention is that the top track in any sequencer takes priority, followed by the second and so on. Likewise, at the receiving end, lower MIDI channel assignments take priority over higher ones. Placing time-critical sequences near the top of your arrangement – kick drums, triggers for loops, percussion and the main synth lines – will ensure the important parts get through first and on time. If you have a SoundBlaster Live! you should also consider splitting your tracks equally between the two synths, to reduce congestion.

As mentioned earlier, parts with a slow attack should be offset by a few milliseconds to ensure note on events don't fall on the beat with other notes. Most sequencers have an offset parameter on each track, sometimes called delay. Continuous controller events, such as volume and pan sweeps, are also a cause of congestion. If you're still having the occasional glitch, try deleting every other event. Chances are that this will go unnoticed to the ear, but it will significantly reduce the load on your MIDI outputs.

GRM Tools

GRM Tools is a collection of four creative plug-ins for VST-compatible applications. Unlike everyday, run-of-the-mill reverb and delay effects, this series is intended for users who require extreme processing capabilities. The package comprises a band pass filter, comb filters, a shuffler and pitch shifter. Nothing out of the ordinary so far. But each plug-in has a twist – you can morph between 16 preset effects in real time. In addition, three of the plug-ins have a Super Handle, enabling several parameters to be tweaked simultaneously within a multi-dimensional display. Intriguing, eh?

Flicking through presets produces outrageous pitch-sweeping effects

The Band Pass filter combines low and high-pass filters configured with a 560dB per octave cut-off slope. Now that's extreme. A filter like the North Pole, which we looked at last month, provides a gentle 24dB cut-off slope in comparison. In addition to band pass, there's a band reject setting which can produce some wonderful phasing effects when you sweep through the frequency spectrum. This is easily achieved when you morph between two presets. A fader enables you to set the transition time.

Comb Filters is a set of five parallel comb filters with a high Q (resonance) setting. Flicking through the presets produces outrageous pitch-sweeping effects that wouldn't sound out of place on one of Fat Boy Slim's productions.

Other uses include hum removal and creating space within a stereo mix. Pitch Accum combines two transposers with a feedback delay. Creating harmonies for vocals would be one use, although I did try it on a few drum loops and was quite taken with the results. Finally, Shuffler splices audio into segments and rearranges them on the fly. It's always unpredictable, perhaps too much so for my liking. If you're into producing music with an experimental edge, though, you'll love it.

All in all, this is a very desirable set of tools for audio manipulation. The only thing I would like to have seen is a way to enter transition times between presets in bars and beats, rather than seconds. That aside, it is highly recommended.

PCW CONTACTS

Steven Helstrip welcomes your feedback on the Sound column. Contact him via the PCW editorial office or email sound@pcw.co.uk

GRM Tools costs £149 (£122.93 ex VAT) and is available from Arbiter on 0181 970 1909

Blots on the landscape

Digital camera-toting Ken MacMahon is having panorama problems – apparently, he's in stitches.

I recently bought a digital camera and I've been having so much fun with it that I decided not to bother with this month's column, but instead continue to irritate my family, friends and everyone else in sight by constantly photographing them.

Then I hit on the genius idea of doing both, so for the foreseeable future, expect these pages to be filled with my experiences at the sharp end of digital photography.

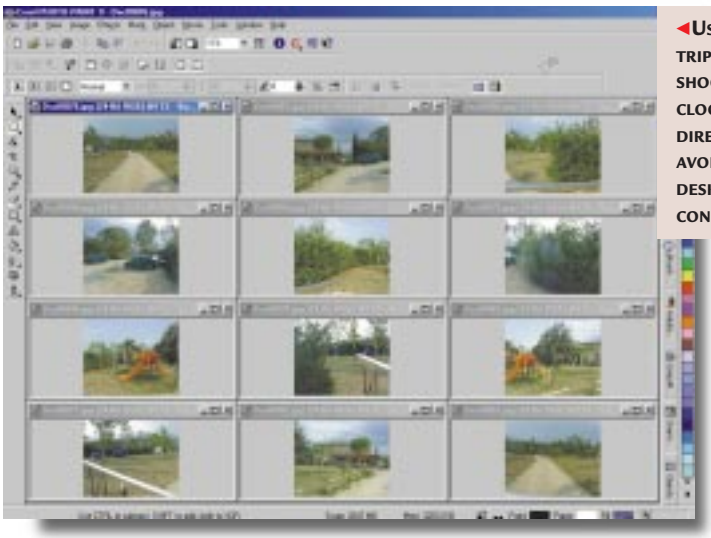
One of the first things I wanted to try out with my new toy was panoramic shots. Panoramic cameras used to be complicated mechanical affairs, involving a tripod-mounted camera which panned horizontally while recording the image onto a strip of film mounted on a rotating drum inside. Then David Hockney turned it into an art form using a Polaroid instant camera and some SprayMount, and since then everyone's been at it.

These days, of course, you can achieve much better, more versatile results a lot more easily. The technology that has transformed panoramic photography is Apple's QuickTime VR. This is part of QuickTime 4, the latest release of Apple's video authoring and playback software available free for Windows as well as MacOS from www.apple.com/quicktime.

Alternatively, you can install QuickTime 3.02 from the CorelDraw 9 application CD.

You can, of course, simply take a load of pictures and stick them together using any old image-editing software, and that's exactly what we'll be doing in just a moment, but QuickTime VR provides a number of advantages. First, it allows you to pan through 360 degrees vertically and horizontally. You can also zoom in and out of the image and use hotspots to jump to other locations or views. For example, you could use a QuickTime VR movie on a website to create a virtual museum tour.

Having cast a critical eye over the editing tools available, I decided on Corel PhotoPaint 9, because it has a nifty feature that allows you to stitch together overlapping images and is one of the few applications to support the export of QuickTime VR movies.



◀USING A STEADY TRIPOD AND SHOOTING IN A CLOCKWISE DIRECTION WILL AVOID A LOT OF DESKTOP CONFUSION

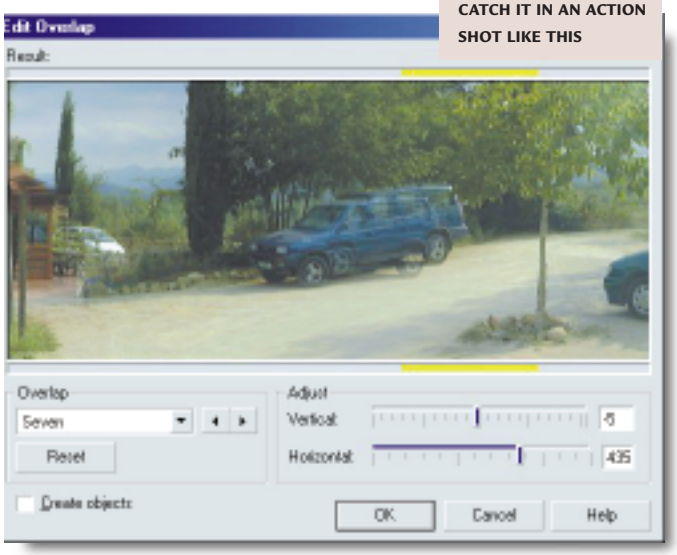
Stitching pictures in PhotoPaint is simplicity itself. First, open all the images you want to use for your panorama. Looking at my collection, it was immediately obvious I had made a few fundamental errors.

For a start, I had been standing at the centre of my 360-degree panorama and taken nine pictures, turning, I suppose, about 40 degrees to the left after each shot to position for the next. This caused me two problems. First, because both PhotoPaint and your brain like to work from left to right, my pictures were in reverse order. Second, many of my shots overlapped by a considerable amount, which made stitching them together more difficult than it might have been.

To stitch your images together, select Image/Stitch and in the Select Images dialog click the Add All button.

If, as I have done, you've gone around anti-clockwise, the button at the top right of the panel reverses the order. Finally, make sure that the horizontal stitch button is depressed before clicking OK.

Next, you should see the Edit Overlap screen, which allows you to adjust the vertical and horizontal alignment of each overlapping section. You can do this using the sliders, but it's actually easier and quicker to enter a value in the numeric field. The preview window shows one image semi-transparent above the other, so it's easy to see what you're doing, and



▼YOU MAY NEED TO CLEAN UP YOUR CAR AFTERWARDS IF YOU CATCH IT IN AN ACTION SHOT LIKE THIS

Questions & answers

Q Our village millennium committee is photographing all the inhabitants and their homes for an album and would like to make all of the photographs available on CD-ROM. Can you suggest some software which we could use to store 200 to 300 photographs, plus some structured text. We will scan in the photographs or the negatives. The contents should be searchable/indexed, eg by surname or address. The software needs to be cheap enough to be provided with each CD, or the publication must be capable of storage in a 'pack and go' format like Powerpoint, and preferably runnable on low-spec PCs. We will be copying a small number of CDs – about 20. Can you suggest how this might be done?

JEAN MORGAN

A ***The two widely used image catalogue applications with the type of features you mention are Canto Cumulus Desktop and Extensis Portfolio. It would, however, be prohibitively expensive to distribute a copy with each CD. One solution is to make use of their Export to HTML feature, which would create a website with captioned thumbnails of the images. This would be searchable using the browser's Find function and would run reasonably quickly on low-specification machines using either Internet Explorer or Netscape Navigator, both of which are free.***

If you can handle an HTML editor, you could link a page with a full-screen photo to the thumbnail preview. In addition to the jpeg thumbnail images, you could include high-resolution scans on the CD for those with an image-editing application capable of viewing them.

You can buy a CD writer for less than £200 and recordable CDs for about £1 each. If you know someone with a CD writer, you can probably persuade them to do it for you in return for a pint. Alternatively, publishing the website via a free account with an ISP will cost you nothing and gain you a much wider audience.

www.canto.com
www.extensis.com

yellow bars indicate the degree of horizontal overlap.

Now it became obvious that more care at the shooting stage would have made things easier and produced better results. Had I mounted the camera on a tripod, it would not have been necessary to adjust the vertical overlap at all and I would also have avoided the problem of the seam. QuickTime automatically stitches the two ends of your panorama together to create a 360-degree image, but, during the course of my rotation, I had lowered the camera by a few degrees, resulting in a severe vertical mismatch. The cars on the extreme left of the image are the same ones that are on the extreme right, about 50 pixels higher up.

Finally, next time I'll avoid including anything in the near foreground, like that entrance barrier. The problem is that when you rotate the camera, the perspective of a close object alters radically, making it impossible to stitch them together in any meaningful way.

At this stage, it's worth doing a little cleaning up. There's bound to be some ghosting where you haven't been able to match up all the detail on overlapping sections and these glitches can be eradicated with a clone brush. Assuming your ends matched up horizontally, it would also be a good idea to create a seamless join, by cutting a narrow section from the left edge and pasting it into position on the right side. You can check the seam using the offset filter from the Effects/Distort menu.

FOREGROUND IMAGES CAN PLAY HAVOC WITH YOUR STITCHING

All that remains is to create the QuickTime VR movie. If you didn't do it with the original images, you should downsample the panorama. Mine is 4,000 pixels wide and occupies about 5MB on disk. For web use, you'd need to go down a lot more. In any case, the width of the image must be a multiple of four pixels.

Next, select Movie/Create from Document, then Save As and MOV-QuickTime VR from the Files of Type pulldown menu. To define objects in the image as hotspots, click the Hot Spots tab, select the object from the list and enter the URL or node you want to jump to. Finally, you can set the VR World size – this is simply the size of the viewing window in which the image is displayed. Obviously, the bigger this is, the more of the entire picture you will see.

To view the QuickTime VR image, double-click on the file in Windows Explorer or open it in the QuickTime player. Here, the final shortcoming of my approach is exposed – my panorama is 360 degrees horizontally but has a woefully inadequate vertical field of view, which is particularly depressing given the beautiful mountain scenery that's missing. Next time, as well as mounting the camera on a tripod, I'll complete three (clockwise) revolutions – an additional one above and below the original plane to add sky and ground detail – then I should be able to crop the entire thing to a neat rectangle to hide those awful jagged edges.

PCW CONTACTS

Ken McMahon welcomes your feedback on the Graphics &DTP column. Contact him via the PCW editorial office, or email graphics@pcw.co.uk

The eye of the beholder

Benjamin Woolley looks at some of the techniques used by 3D animation pioneer Disney.

Disney's *Beauty and the Beast* was one of its first animations to feature computer graphics. They were mostly used in one scene, when the apparently ill-matched eponymous couple danced in the candle-lit ballroom of the Beast's castle.

Those of us in the know could immediately see that the scene was computer-generated. It was not the quality of the drawing that gave the game away, however. Indeed, the twirling pair who were the focus of our attention were hand-drawn in the conventional way.

The giveaway was the camera movement. It began from the top of an impossibly high ceiling, and craned down until it reached a close-up of Beauty and the Beast. The clever bit was that it did this using the same whirling movement as the couple, swinging around them as though tied to them by a gradually shortening length of invisible string.

Few viewers would have been aware of the computer's presence in this scene. They probably did not notice the use of computer graphics in *Aladdin*, either, which featured a magic carpet roller-coaster ride through a computer-generated landscape. In both cases, computers were primarily used because of the nature of the camerawork involved.

In conventional animation, the camera (that is, the audience's point of view, or PoV) is very simple – a 2D plane perpendicular to the landscape, set a small distance from the foreground of the scene. Anything more elaborate presents big problems. It means having to redraw not just the moving elements in any scene, but everything else too, to show what it would look like from a different perspective.

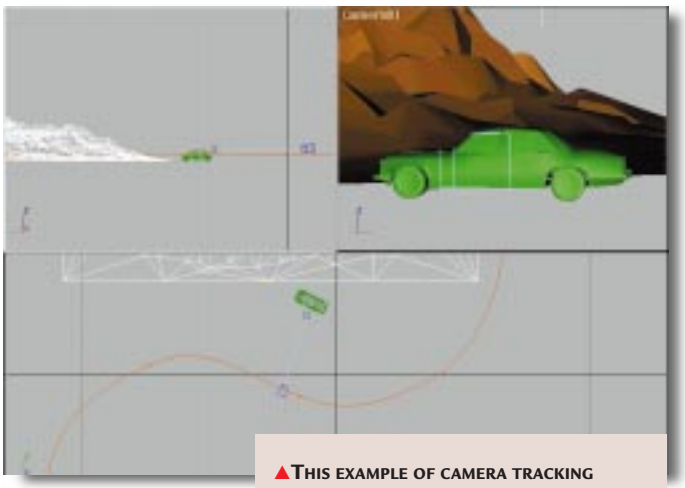
With computer graphics, the problem is not nearly as acute. The camera can burst through the 2D PoV plane and really get into the action, allowing the audience to become bound up with the principal characters as they move freely through the landscape.

To realise these sorts of effects, the camera itself has to be animated. Most packages include a variety of tools designed to help achieve this. One of the most useful is the Look At function, which enables you to tell the camera to keep facing a particular object, even when both camera and object are moving. That, crudely, is what was done in *Beauty and the Beast*. Despite the principal couple moving around the dance floor, and the camera dancing around the roof space above them, the camera's gaze on Beauty and the Beast never flinched.

Another method is to tie the camera directly to an animated object so that it moves wherever the object moves. For example, when Aladdin's magic carpet hurtles along, the camera sticks to it, swooping through tunnels, soaring over buildings and so on as though it, too, was one of the carpet's passengers.

Despite Beauty and the Beast whirling around the dance floor, the camera's gaze didn't flinch

This sort of effect is normally achieved with an invisible 'dummy'. A dummy acts as a parent object to which the camera and the object being filmed are linked in a simple hierarchy. It is a mobile platform upon which both the camera and the main characters can stand. You can move this platform around, knowing that the objects on it, including the camera, will move with it.



▲ THIS EXAMPLE OF CAMERA TRACKING IS TAKEN FROM THE PROJECT USED TO ILLUSTRATE LAST MONTH'S COLUMN OF A CAR DRIVING THROUGH MOUNTAINS. THE LOWER, RECTANGULAR VIEWPORT SHOWS THE CAMERA'S ANIMATION PATH AS A RED, CURVING LINE, WHICH WAS DERIVED FROM THE LINE OF THE ROAD ALONG WHICH THE CAR IS DRIVING (NOT DISPLAYED). THE 'LOOK AT' PARAMETER OF THE CAMERA HAS BEEN SET TO KEEP THE LENS POINTING AT THE CAR AS IT MOVES ALONG THE ROAD

The big advantage of using a dummy object is that you can change the position of the elements linked to the object relative to one another, without changing their overall motion through the scene. For example, in the case of *Aladdin*, the camera tracked around the carpet's passengers as both the dummy and the carpet continued along their roller-coaster ride.

Just as camera animation introduces possibilities, it also creates some complications. Chief among these is creating a suitable animation path.

For example, a path designed to animate a dodgem car will not suit a camera. Unless the camera's PoV is that of a driver of the dodgem, it will not seem natural for the camera to take sudden 90-degree turns or come to an instant halt.

Ideally, therefore, the link between a camera and the object it is filming should be an elastic one. There should be slack so that it can swing out a bit as

the object turns corners, slow down and accelerate at a more even rate, or bank at a sharper angle. You might even want to add kinks to the path to simulate camera shake or similar naturalistic artefacts. This requires a pretty sophisticated understanding of keyframe parameters, so make sure you have a good grasp of them before rushing headlong into rendering.

◄FIG 2 THIS IMAGE IS BY MICHAEL KOCH, A 3D ARTIST WITH A WEBSITE AT WWW.MWORX.COM (STILL UNDER CONSTRUCTION WHEN I VISITED IT). THE DIAPHANOUS, FLUID TEXTURE OF THE GIRL'S BLOUSE IS PARTICULARLY IMPRESSIVE

■ Impulse Imagine

Nothing upsets some readers of this column quite as much as a failure to mention their favourite software. Andrew Stevens, for example, sent a withering email in response to my foolhardy statement two months ago that I knew of no package which included focus as a camera parameter. 'I take it you've never played around with the Depth Of Field parameter in Impulse's Imagine, then?' he asks. He is correct, I am ashamed to say.

Impulse Imagine is a 3D package which, like a lot of graphics software, originated on the Amiga. I haven't yet managed to get hold of a copy, but after some hunting, I did find some information relating to it on the web. Impulse's home pages are at www.coolfun.com, and there is a useful resources page to be found at Conney's Corner, www.is.kiruna.se/~cjo/imagine.html, which has an extensive range of FAQs and a digest of the Imagine Mailing List. I would be interested to hear from readers of their experiences using this software – and, indeed, of any other 3D software they might be using.

■ More MAX

No doubt adding to the irritation of the likes of Andrew, I thought I ought to take a quick look at 3D Studio MAX Release 3 (3DSMAXR3), the latest version of the package I use most. As usual, there is the obligatory claim of an all-new, better and faster renderer – every new release of every new package seems to make this boast.

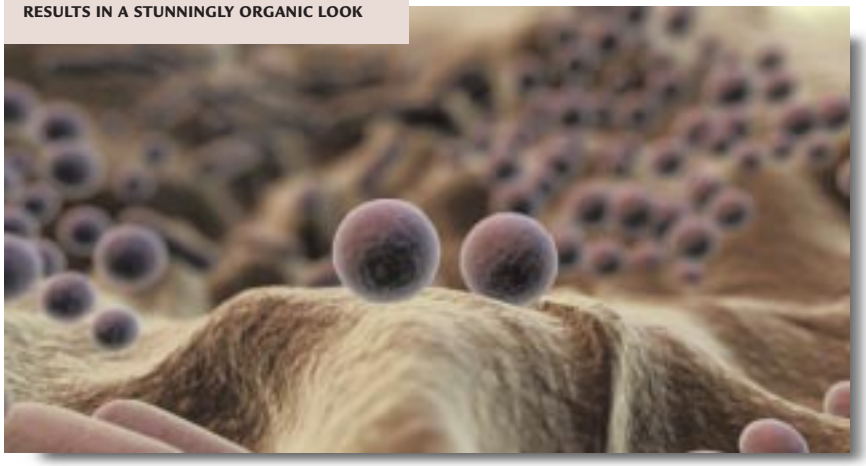
This time, however, there really has been a significant change. The architecture of the renderer has been redesigned so that core stages of the rendering process, such as anti-aliasing (the process of smoothing out hard edges) are separated out. This will make rendering much more flexible. It will be interesting to see whether the mainstream mid-range packages will follow this route.

Another significant development is a renewed emphasis on tools designed to help produce more organic-looking models. We all know by now about NURBS (Non-Uniform Rational B-splines). 3DSMAXR3 now has NURMS – Non-Uniformally Rational MeshSmooth. There is a useful website on these and other Release 3 features at www.ktx.com/3dsmaxr3/html/organic_modeling.html. These seem to provide a sort of half-way house between conventional modelling and NURBS, allowing surfaces of objects to be manipulated like soft clay.

MAX also includes a much more comprehensive range of tools for reaching down into the geometry of models. Of course, as always, the more tools you have, the more complex the job becomes, and you will find that the learning curve for Release 3 is a real Everest.

However, if you are prepared to climb the mountain, it appears that you will be rewarded with some lovely views, at least if the example renderings provided with the package are anything to go by – see Figs 2 and 3.

▼FIG 3 THIS IS CALLED INTIMATE STRANGERS AND WAS CREATED BY MONDO MEDIA WWW.MONDOMEDIA.NET. THE MODELLING SEEMS QUITE SIMPLE, YET RESULTS IN A STUNNINGLY ORGANIC LOOK

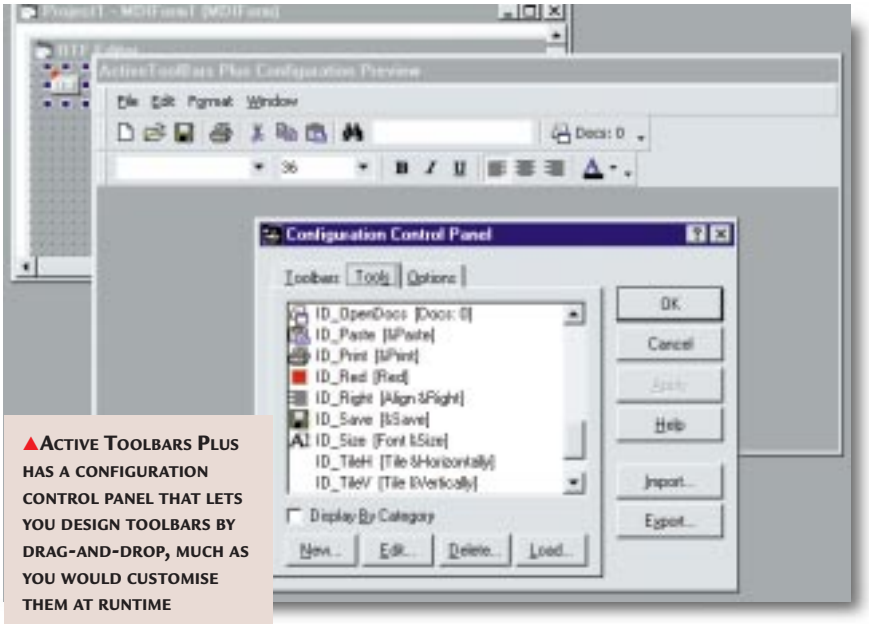


PCW CONTACTS

Benjamin Woolley welcomes your comments on the 3D Graphics column. Contact him via the PCW editorial office or email 3d@pcw.co.uk

Tool hot to handle

Tim Anderson looks at jazzy toolbars in Visual Basic, the new Delphi 5 TFrame component, and how to choose a data access API.



▲ ACTIVE TOOLBARS PLUS HAS A CONFIGURATION CONTROL PANEL THAT LETS YOU DESIGN TOOLBARS BY DRAG-AND-DROP, MUCH AS YOU WOULD CUSTOMISE THEM AT RUNTIME

Floating and docking toolbars are a mixed blessing from a usability point of view. The idea of customising your working environment is excellent, but against that is the problem that users may lose icons because their position is no longer fixed. They do look good, though, and including this feature in an application makes it look more up-to-date with Microsoft Office and many other shrinkwrap solutions.

For the developer, making toolbars float and dock is not necessarily easy. Visual C++ developers get MFC support, while Delphi's VCL has docking windows in version 4.0 and higher, but there is considerable work involved in creating full-featured floating and customisable toolbars. VB users have to put up with a basic fixed toolbar control, or the toolbar control that has sliding panels but still refuses to float. It is a good candidate for a third-party control and that gap is filled by Sheridan's Active ToolBars Plus. The latest version aims to emulate not only floating, docking, sliding toolbars as found in Office 97, but also the smart personalised menus and dropdown icons of Office 2000.

An important feature of ActiveToolBars is that you only have one click event

There are three controls in Active-ToolBars Plus, including the ActiveToolBars control itself and ActiveTab and ActiveTab panel controls that come as a bonus. At design-time, the ActiveToolBars is a disappointing single icon, but its true capabilities are exposed by the right-click Configure option. This gives you a control panel similar to the Customise option found in Microsoft Office applications, but with some extra possibilities. On the first tab, a New button creates either a toolbar or a menubar. The second tab lets you define and edit tools, complete with an image editor and the ability to steal icons from other applications. Once you have defined a tool, you drag it to a toolbar to build it, just as the user would at runtime. The third and last tab has options including animation, tooltips and shortcut keys.

An important feature of Active-ToolBars is that you have only one click event to worry about. The ToolClick event has a Tool parameter and you can reliably detect which tool has been clicked by inspecting its ID property. Since any individual tool can appear on an unlimited number of toolbars, or as a menu option, this centralised event handler is convenient.

The built-in functionality is impressive. Menu items can be always visible, or visible if recently used, as in Office 2000. Docking, floating and user customisation are built-in. There is also a SaveLayout method that makes it easy to save the current layout to disk.

ActiveToolBars Plus is excellent if you want to add this kind of feature, particularly for VB developers. There are still plenty of pitfalls, however. It is easy to crash the supplied example application, an RTF editor, by removing certain tools at runtime with the Customise option. The code assumes these are still present and raises a run-

◀ AN EXAMPLE APPLICATION WITH FLOATING AND DOCKING ACTIVE TOOLBARS

time error. Making a user interface configurable and robust is a challenge. Even so, this is a well-designed package and considerably easier than rolling your own smart toolbars.

Using frames in Delphi 5

The biggest change in the Delphi 5 VCL is the new frame component. Frames are a clever idea, although at first sight it is not obvious how they work.

It is only worth using a frame if you have some customised component or group of components that will appear on more than one form. To take the simplest example, imagine you wanted a corporate logo to appear on every form in an application. To make things a little more interesting, we will have it so a message appears when you click on the logo. Here are the steps:

1 Start a new application, and from the File menu choose New Frame.

2 The design surface of the frame looks similar to a form. Place a label on the frame and give it a suitable caption and font. In the handler for the label's OnClick event, write a line of code to display a message. Rename the frame, say to 'frameLogo'.

3 Open the application's main form, and from the Standard tab in the component palette choose the Frame component. When you place it on the form, it throws up a dialog asking which frame you would like to use. Select your logo frame.

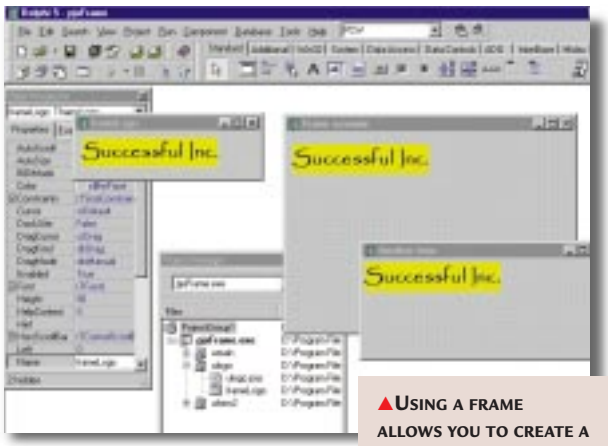
Because frames have no border, it can be tricky to move a frame with the mouse if its components fill it completely. There is nothing to grab onto, so you end up moving components within the frame instead. The solution is to edit the Top and Left properties in the property inspector.

4 Run the application. When you click the logo your message appears.

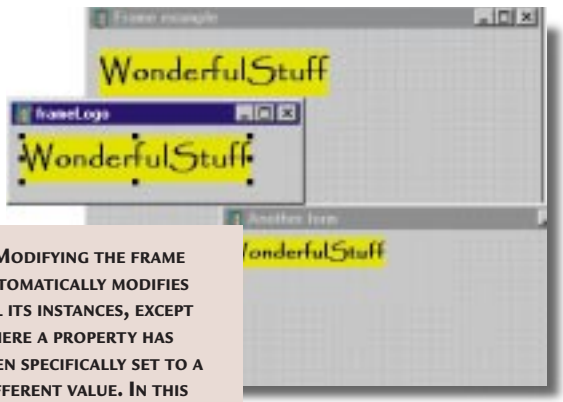
The ins and outs of frames

Where this gets interesting is where you have several instances of the frame in use in your application. For example, if the company changes its logo, you only have to modify the original frame, and the changes automatically appear in all the instances. That's good, but what if you wanted to modify just one of the instances, for example to use a smaller font on one particular dialog? This is not a problem. The properties of the frame's components are fully exposed in each instance and you can modify them as required. Properties specifically set for a particular instance are sticky; they override the inherited properties and will not change even if the parent frame changes. Other properties continue to inherit changes.

The screenshots below show how a particular instance of the logo frame keeps its modified font size, but still reflects changes made to the text of the caption in its parent. If you decide you don't want this behaviour after all, there is a Revert to inherited option on the frame's right-click menu.



▲ USING A FRAME ALLOWS YOU TO CREATE A CUSTOMISED GROUP OF COMPONENTS FOR USE ANYWHERE IN A PROJECT



▲ MODIFYING THE FRAME AUTOMATICALLY MODIFIES ALL ITS INSTANCES, EXCEPT WHERE A PROPERTY HAS BEEN SPECIFICALLY SET TO A DIFFERENT VALUE. IN THIS EXAMPLE, THE FONT SIZE IN THE SECOND INSTANCE HAS BEEN SET SMALLER

Using frames can save resources. If you have a bitmap in a frame, only one copy will be saved in the project's resources, however many times you use it. They also make applications easier to maintain. You can use data-aware components on a frame, so one obvious use would be to embed database functionality into a frame. For example, you could create a frame for listing, adding and deleting customer records. Afterwards, you could use that frame anywhere that a customer list is required.

One limitation of frames is that although individual instances can have different property settings from the parent frame, you cannot remove any components. There is no problem, however, in adding new components.

Getting polyphonic with VB

Derek Ballard asks: 'I have written a program in Visual Basic 6, which sounds bells, in WAV files, one after the other. Using the sndPlaySound DLL call, each sound stops when the next one starts.

The real problem is that a sound can be lost altogether if another one follows immediately. Is it possible to use MIDI, or some other mechanism within the program, to provide polyphony?'

First off, do not use sndPlaySound because it is only maintained for backward compatibility. The PlaySound API function that replaces it has a few more options. It is a simple function that looks like this:

```
Public Declare Function ↙
   PlaySound Lib "winmm.dll" ↙
Alias "PlaySoundA" (ByVal ↙
lpszName As String, ByVal ↙
hModule As Long, ByVal ↙
dwFlags ↙
As Long) As Long
```

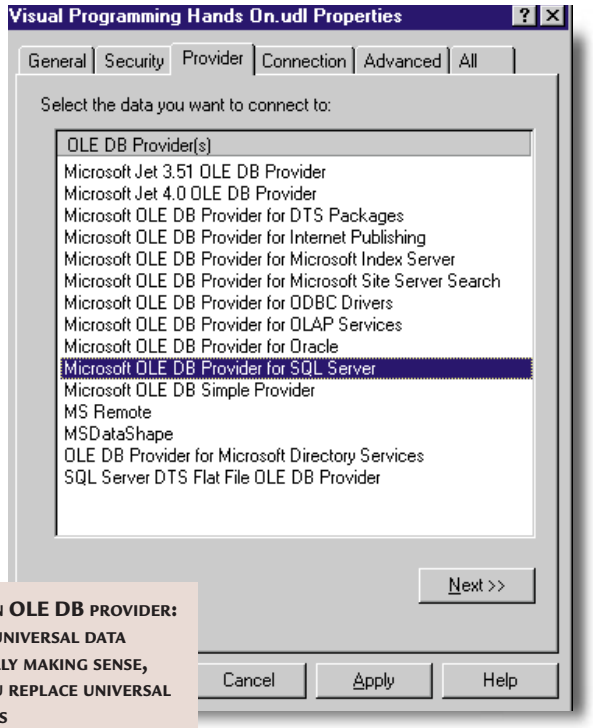
(Key: ↙ code string continues)

The Flags parameter specifies options including synchronous or asynchronous operation, and the SND_NOSTOP flag which tells the function not to stop a sound that is playing already. If it is still playing,

the function returns false without interrupting the sound. Therefore, you can ensure that each sound is played in its entirety, and by checking the return value you can check that every sound is played.

What this does not get you is polyphony. MIDI is one answer, although this is a very different way of obtaining sounds. Whereas .WAV files are true digitised sounds, MIDI sounds simply specify what sound is required. It is up to the MIDI player to determine how to render it, and these vary from player to player. This may or may not be satisfactory, depending on the purpose of the application. The solution would be to obtain a sequencer for editing and saving the MIDI compositions, and to stick to sounds in the standard General MIDI set, which is supported by every modern MIDI player. You will get polyphony, up to the limits of the sequencer or player, whichever is less. This is an easy solution, since MIDI files can be played using the VB multimedia control.

If you need to play .WAV files with polyphony, then the DirectSound API, with built-in mixing capabilities, will do the trick. There is also an ancient, now unsupported Microsoft DLL called Wavemix that has limited mixing options. Unfortunately, DirectSound is relatively complex and the example applications use C++. Probably the easiest option is to find a third-party component that will handle the low-level coding for you.



▶ **Choosing an OLE DB provider: Microsoft's universal data access is finally making sense, at least if you replace universal with Windows**

ODBC is for remote data and is rarely the right choice for file-sharing databases

■ Which database API?

Adrian Mulhall writes: 'I currently use VB5 and DAO to access Access, or RDO to access SQL Server/Oracle, but this necessitates developing two parallel applications because of features such as OpenRecordsets and OpenResultsets and the various different requirements between the two, like including database names for Oracle.

'Is there a method, using different access methods such as ADO, where my recordset constructs and record handling could be common, with only the initial connection settings being different? Also, if you could outline the pros and cons of the different database access methods, this would be of great interest.'

Microsoft has given us more database APIs than is really decent and this does cause some head-scratching. Some, like ODBCDirect, have been introduced solely to solve performance problems with others. Certain routes to data, such as using the Access ODBC driver, are particularly poor. So what should you use? The matter is further confused by the combinations available, such as DAO (Data Access Objects), JET and ODBC together.

Different considerations apply to different cases, but here are some general pointers. ODBC is the oldest Windows data access standard – which means that drivers are likely to be mature – and it is fast. ODBC is designed for remote data and is rarely the right choice if you are working with file-sharing databases like dBase, FoxPro or Access. Assuming you are working with a suitable database such as Oracle or SQL Server, ODBC will probably yield the best performance as long as it is used efficiently, which means RDO (Remote Data Objects), ODBCDirect or even calling the ODBC API directly.

DAO is a COM API for the JET database engine used by Access. Again, it is mature, and probably the fastest way to use Access data. It is a poor choice for client-server work, however.

ADO is the newest COM database API and runs against OLE DB, a lower-level COM interface. ADO uses drivers called OLE DB providers. The default OLE DB provider is for ODBC, so you can use ADO with ODBC, but there is a performance cost. ADO and OLE DB represent Microsoft's current database strategy, and after a couple of years it is becoming useful. The latest drivers for JET and for SQL Server are much improved.

In particular, ADO has been designed with Windows DNA (Distributed Internet Applications) in mind, so for multi-tier or web-based solutions it is the preferred option. VB 6.0 has ADO support built-in.

Overall, the answer is that you should use ADO if you can, although there might still be good reasons to use RDO for ODBC or DAO for Jet. Note that in Windows 2000, the data access components will be part of the base operating system, so developers can count on their presence.

Finally, the idea of switching database engines simply by changing a connection parameter is a false trail. There are too many differences in SQL syntax and optimisation techniques for this to work, although using ADO throughout will help. What you can do instead is encapsulate data access into custom objects so that your client code is database-independent.

PCW CONTACTS

Tim Anderson welcomes your Visual Programming comments and queries. Contact him at visual@pcw.co.uk or via the PCW editorial office

◆ *ActiveToolbars Plus costs £149 (£175.08 inc VAT) from Contemporary Software 01344 873434 www.contemporary.co.uk*

Worm in the Apple

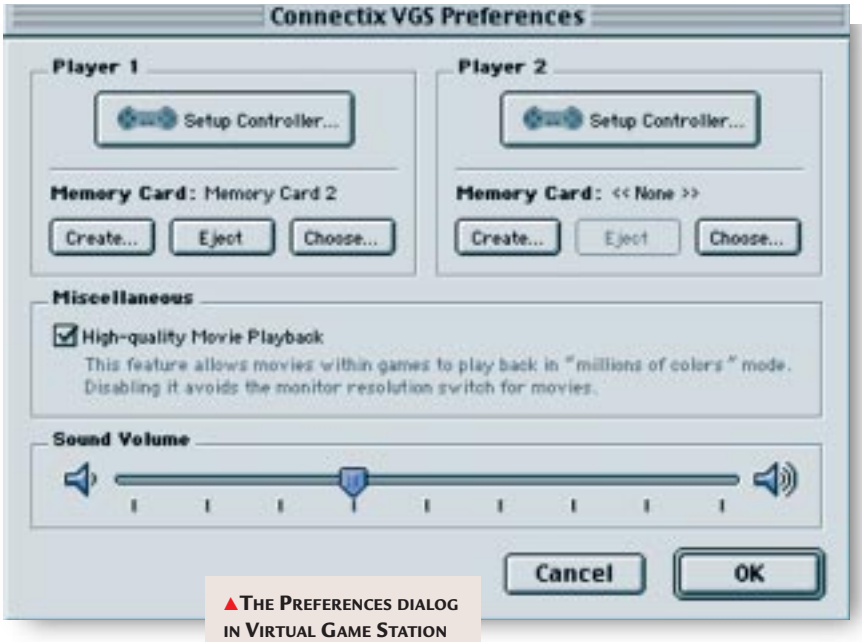
Cliff Joseph wonders why Sony is underestimating the power of the latest emulation software.

As we go to press on this issue, Connectix is about to enter the final stage of its David-and-Goliath legal battle with Sony over the fate of its Virtual Game Station Software.

Connectix, as you may well be aware, is the company that produces Virtual PC, the software emulator that enables Macs to run PC software. The Virtual Game Station (VGS) works on the same principle as Virtual PC, using software to emulate the hardware inside a Sony PlayStation.

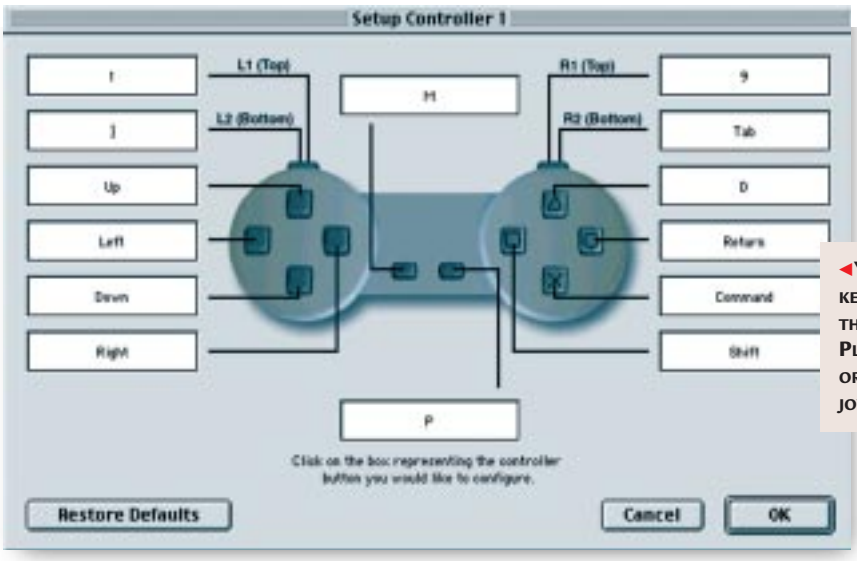
This rather wonderful idea allows the Mac to play PlayStation games – not every single game that's available, admittedly, but a pretty good selection of them nevertheless.

We were fortunate enough to pick up a copy of VGS at the MacWorld Expo in New York a couple of months ago and bring it back to the UK. And, much to our surprise and delight, we found that it works extremely well – that is, as long as you have the right hardware and software setup on your Mac. So, this month, we're going to let our hair down a bit and explain how you can use the VGS to play PlayStation games.



▲THE PREFERENCES DIALOG IN VIRTUAL GAME STATION ALLOWS YOU TO CONTROL SOUND, MEMORY AND OTHER SETTINGS FOR PLAYSTATION GAMES

It would have made sense, of course, to call the program Virtual PlayStation rather than Virtual Game Station but then Sony's legal eagles would have gone even more bonkers than they have done already. Sony is attempting to have the sales of VGS banned, by arguing that somehow it encourages people to pirate PlayStation games. That's nonsense, of course. All it does is encourage Mac users – who have actually been starved of games for years – to go out and buy legitimate copies of PlayStation games. As proof of this, I can personally attest that while I was researching this column, I spent a small fortune on perfectly legitimate PlayStation software that I would not otherwise have been able to use.



◀YOU CAN USE THE MAC'S KEYBOARD TO DUPLICATE THE CONTROLS ON THE PLAYSTATION GAMEPAD, OR USE A MAC-COMPATIBLE JOYSTICK IF YOU PREFER

Let's hope that the courts see sense and decide to overturn Sony's case. If that doesn't happen, then the logical extension of such a decision would be to make other emulators, such as Virtual PC and SoftWindows, illegal as well.

Whatever the outcome of this case, VGS is still a really neat piece of software. However, it hasn't been distributed in the UK so far, for a number of reasons. The first is simply that PlayStation games, like videotapes, have to be produced in different versions that

work with the specific television formats used in different countries.

Take a look at the PlayStation games in your local branch of Woolworth and you'll find that they have a little PAL logo somewhere on the cover to indicate that they work with the PAL television system used in the UK and throughout most of Europe. And of course, the US version of any PlayStation game will have a label indicating that it works with the NTSC television format used in the US.

On top of that, the US version of VGS is designed to run on the US version of the Mac operating system. It also has certain specific hardware requirements, which we'll come to in a minute. There are ways around all of these problems, though. The first thing to do is get hold of the software itself. You can order it from websites such as www.outpost.com for just $50 (£31.25), which is less than a third of the cost of buying an actual PlayStation.

Then, of course, you need to find NTSC versions of the games that you want to play. Again, you can order these over the internet, but there are also quite a few specialist shops within the UK that stock US versions of games. Many of these shops also sell second-hand titles – we managed to pick up the PlayStation version of Doom – which combines Doom II and the Final Doom add-on pack – for a mere £12. (Doom may be looking a bit dated now, but at least I can now thrash my nephew – who's used to playing it on his PlayStation – at the Deathmatch game.

The program's hardware requirements are a little more problematical. VGS needs to run on a G3 Power Mac, an iMac or an iBook, and it isn't guaranteed to run on older machines, even if they have been upgraded with a new G3 processor card.

First-generation iMacs may be a bit sluggish when playing PlayStation games

It also requires an ATI graphics chip. That means you need the Rage, Rage Pro or Rage 128, and it's only G3 machines and iMacs that have these built in as standard. I suppose you could try to buy one of the cards, but it would probably be both cheaper and easier just to go out and buy a real PlayStation.

First-generation iMacs running at less than 300MHz may be a bit sluggish when playing PlayStation games, but any iMac or PowerMac that runs at 300MHz or more should be fast enough to play games at full tilt.

Assuming that you have the necessary hardware, you will also need a non-UK version of the Mac OS, and that needs to be at least version 8.0. You don't specifically need to have the US version of the operating system, however. Both Mac OS 8.5 and the recent 8.6 update have an option that allows you to install either a UK-specific version of the operating system or a World Wide English version. The latter version seems to run Virtual Game Station perfectly well.

If you are reluctant to change the UK version of the Mac OS on your primary hard disk, you could always install the World Wide English software on a backup device like a Jaz or Zip drive. Once you have this installed, you can go ahead and load the VGS. And, unlike Virtual PC, which needs stacks of memory to run efficiently, VGS will run quite happily in about 10MB of RAM.

The Preferences dialog box within the VGS software allows you either to configure your keyboard or to use a Mac-compatible joystick or game pad as a replacement for the standard PlayStation game pad. This can be a bit of a fiddly process, as there are quite a few buttons on a PlayStation pad and they sometimes perform more than one action depending on whether you're actually playing the game or are inside one of the game's menus. It works really well, though, and you'll find that you can be up and running with PlayStation games in a couple of minutes.

VGS isn't compatible with every single PlayStation game that's available, but Connectix keeps a regularly updated list of compatible games on its website at www.connectix.com. So take a look and see whether there's anything on there that takes your fancy. Hopefully, some time this year, Sony will lose its court case and Connectix will be free to develop a proper European version.

◀BINGO! HERE'S THE PLAYSTATION VERSION OF DOOM MERRILY RUNNING ON A G3 POWERMAC

PCW CONTACTS

Cliff Joseph welcomes your feedback on the Mac column. Contact him via the PCW editorial office or email mac@pcw.co.uk

Trust is the key

Bob Walder delves into the levels of security available when acquiring your digital certificate.

Over the last couple of months, I have covered the basics of cryptography and the differences between secret key and public key technologies. I then looked at the use of digital signatures and digital certificates. This month we will move on to how you might actually acquire your own digital certificate and how you would go about using it.

There are several places where you can get hold of your certificate – certification authorities (CAs) can be operated by employers, banks or government bodies, for example.

The key requirement is that the body can be trusted. Trusted to offer confidential services. Trusted to keep your private details private. Trusted to operate a secure facility so that undesirables cannot simply walk through the door, or hack into their computer systems and make off with our private keys (if they are kept on site). Above all, the CA must be trusted not to allow its own root keys to be compromised, which would immediately invalidate every certificate issued under those keys.

The assurance level depends on how a person's identity is verified during enrolment

All in all, this is a large responsibility which requires a huge investment in infrastructure, physical security and personnel. This is why there aren't many CAs around at the moment. One of the best known is VeriSign, so we will concentrate on it in this month's *Hands On*, although the procedures described here will be similar no matter which authority you use.

In a digital ID, a key pair is bound to a user's name and other identifying information. When a digital ID is installed in a web browser, it functions as electronic credentials that can be verified by PKI-aware applications. This enables digital IDs to be used in place of password dialogs for information or services that either require membership

THE EASY WAY TO GET A DIGITAL ID

Here's the good bit – how do you go about getting a digital ID? We'll be sticking with a Class 1 digital ID, which is the easiest to obtain, and you will use the browser enrolment service to request one from VeriSign.

1 Fire up your browser and go to www.verisign.com/client/enrollment/index.html.

2 Click on Enrol Now.

3 Complete the enrolment form with your name and email address – this is used to mail the PIN number back to you.

4 The easy website registration section can be used to simplify registration and replace passwords at certain websites that accept digital certificates. If you would rather not provide personal info, such as your date of birth, postcode and country, you can click on No here.

5 Enter your Challenge phrase. This is your password, which will protect your private keys on your local hard drive, so make sure it's secure.

6 Select full service ID for $14.95 (£9.34) or a free 60-day trial. Selecting the latter is a good way to try out this technology, but be aware that the trial ID does not include revocation, replacement or renewal (*see previous articles for explanations of these*).

7 If you want the full service ID, complete the billing information, otherwise leave this blank.

8 If you use smart cards, you can select the appropriate one at the Cryptographic Service Provider prompt. Most users should leave this set at the MS Base Crypto Provider default.

9 Choose 'Level of security for the private key associated with your digital ID'. These security settings are provided to protect your private key, which resides in your computer's registry. Your private key is the part of your ID that only you are supposed to have. Every time you use your digital ID, your private key is accessed. The medium and high options ensure that

or restrict access to particular users. A digital ID is signed by the CA that issued it – in our case, VeriSign.

Multiple digital IDs can be attached to a message or transaction, forming a certification chain where each digital ID testifies to the authenticity of the previous ID. The top-level certification authority must be independently known and trusted by the recipient, and this is achieved by hard-coding Root CA certificates in the web browser (more on this next month).

VeriSign digital IDs are differentiated by the level of assurance they provide regarding a person's identity. The assurance level depends on how a person's identity is verified during the enrolment process. The class of digital ID that is appropriate for you will depend on how you intend to use it and the level of identity assurance required by the individuals or organisations with whom you communicate.

VeriSign Class 1, 2 and 3 digital IDs are intended for use by individuals – no assurance is made regarding the individual's affiliation with a company or organisation. Class 4 digital IDs are intended for business use. In addition to providing assurance of an individual's identity, a Class 4 digital ID verifies and assures the individual's relationship to a business or organisation.

A Class 1 digital ID provides you with an unambiguous name and email address, and you can obtain one regardless of where you live. If you intend to use your digital ID for casual www browsing, a Class 1 digital ID will probably provide the level of assurance you need.

Class 2 digital IDs provide identity assurance by requiring third-party verification of your name, address and other personal information. At this time, VeriSign Class 2 digital IDs are only available to residents of the US and Canada. VeriSign's automated enrolment system checks the information you provide against a consumer database maintained by Equifax. Expected uses of Class 2 digital IDs for browsers include most online purchases and online subscriptions.

Class 3 digital IDs provide an even higher level of identity assurance, by requiring that you appear before a notary to have your digital ID request authenticated. In addition to submitting your application electronically, you must mail a notarised copy to VeriSign before your enrolment application can be processed. Class 3 digital IDs provide the highest level of assurance typically needed by an individual. Expected uses include electronic commerce applications such as electronic banking, and online services for which you have to pay a fee.

Once you have the digital certificate in your web browser, you will want to know how to view it and use it. You will also need to know how the same certificate can be used to digitally sign your email. All these topics will be covered in next month's column.

your private key is only being accessed with your permission.

- **High** – This setting will require you to enter a password before your private key is accessed.
- **Medium** – This setting will alert you and ask for your permission before your private key can be accessed.
- **Low** – This setting will not add any additional security. This means your private key is protected only by your system's login procedure. I usually go with low, to be honest, but if you want more security you should check the Protect Your Private Key option.

10 Read the Subscriber Agreement and the Certificate Practice Statement (CPS) and click on Accept.

11 Confirm your email address – make sure this is spot on or you will not be able to use your ID.

12 Check your email – within seconds you will receive an email with a unique PIN number embedded in it in addition to a URL.

13 Select the PIN number and copy it.

14 Go to the URL specified.

15 Paste the PIN number in the box provided.

16 Click on Submit.

17 The digital ID is generated by the CA.

18 Once the digital ID has been generated, it can be installed. Clicking on the Install button ensures that it will be stored and recognised by your browser.

PCW CONTACTS

Bob Walder is a journalist and networking consultant based in Bedfordshire. He can be contacted via email at the usual address: networks@pcw.vnu.co.uk

Rise of the Russian Alligator

Those of you who were fans of Team Apache will welcome the launch of another title from the same software house. **Ka-52 Team Alligator** sees you take control of the Ka-52 Russian attack helicopter. Revolving around the Belarusian war and Tajikistan conflict, we expect it to be a realistic simulation with a lot of carnage. Technical improvements include better AI and a new 3D engine called Daedalus, which promises to make everything look better than ever. Check out www.gtgames.com for more details.

Battlezone II is also nearing completion. We took a peek at a preview version and it looks like a definite improvement on the original at this stage. The first Battlezone was innovative, combining the adrenaline rush of a first-person shooter with the guile of a realtime strategy game. The beauty of it was that you could get into it at different levels – choosing to launch straight into the action parts of the game, or simply concentrating on the strategy side of things. We expect this sequel to be a big improvement, particularly in the multiplayer mode. Download a demo at www.pandemicstudios.com.

▶ FIND YOURSELF IN A WHOLE NEW UNIVERSE IN X: BEYOND THE FRONTIER
▼ BATTLEZONE II SHOULD BE READY TO ROLL OUT SOON

A space simulation, **X: Beyond the Frontier**, is nearly upon us. You play a pilot transported to a different universe by accident and end up fighting and trading for a helpful alien race. The graphics on the preview version are stunning and it appears to be quite in-depth – with six different civilisations, more than 30,000 objects and plenty of dialogue. Check out www.thq.co.uk and look out for a full review in a future issue.

Hostile Waters, a realtime 3D strategy war game, is due for release in the first few months of 2000. It boasts a strong script and narration by former *Doctor Who* star Tom Baker. Played from both first and third-person perspectives, developer Rage claims it will combine exciting missions with excellent resource management. You play the captain of a ship, building a force to fight a group of dictators. See **www.rage.co.uk**.

Rogue Spear

The follow up to last year's successful Tom Clancy tie-in *Rainbow Six* is nearly ready. **Rogue Spear** continues the story of Rainbow, a task force set up to combat terrorism across the globe. In the original you co-ordinated raids against targets that had been taken over by terrorists. Once you had organised your troops you sent them in to take the hostiles out.

The original game was famous for some slightly dodgy AI – members of your team would tend to get stuck in front of doors, trapping you and forcing you to shoot them. Developer Red Storm is promising to solve that problem, and add a whole host of new features, such as sniper support. Players will be able to help their team mates out with a few well-placed shots. The standard array of better graphics, sound, special effects and so on are also promised in the new version. The screenshots we've seen look pretty good, so look out for a full review soon. Until then check out **www.roguespear.net**.

JASON JENKINS

Grand Theft Auto 2

In a city of crime you must earn the respect of the gangs – but attract the police at your peril.

The original Grand Theft Auto was an extremely controversial game and attracted publicity from all quarters. One of the few games to receive an 18 certificate from the BBFC, it was condemned by many as being too violent. It was certainly a violent concept, and the bad language offended some, but underneath it all was lurking a very good product.

In a cross between a driving and an action game, you were given free rein in a city overrun by crime, and had to commit criminal acts in order to earn money and progress through to the next level. A mission pack kept the fans clamouring for a sequel at bay, and now the real thing is finally here. But does it live up to all the hype?

The original team from developers DMA was brought in to work on this version and opted for a policy of evolution rather than revolution. This follow-up also has an 18 certificate and definitely deserves it. The top-down view of the city has been maintained. This may disappoint those who were hoping for a true 3D environment, but we felt that it continued the distinctive feel of the original. Despite this, there have been some changes. The graphics are better developed this time around, and there is 3D of sorts in that you can stand on buildings and platforms and lob objects at passers-by.

There are quite a few fundamental differences in the gameplay, however, and it is these that make GTA2 worth playing. The biggest difference is the role that the gangs play. There are six gangs ranging from the ultra-cool Yakuza to the bizarre Loonies who drive cars with smiley faces on the top.

The way to get ahead in the game is to earn the respect of one or more of the gangs by stealing cars and taking out members of their rival gangs. You can have a very high respect level with each gang, be neutral, or have a very low level of respect. If your respect level is low and you inadvertently wander into that gang's area – watch out, they will try to kill you. If you have enough respect, each of the gangs will dole out missions for you to complete, usually involving selling drugs, helping a gang member to get away from a bank robbery or, if you're working for the Loonies, destroying a pizza van for being late with the boss' pizza.

You don't have to accept these missions to succeed, though. You can make a fairly lucrative career out of stealing taxis and buses, picking up people for a ride and taking them round the city. You can steal hot dog and ice cream vans and sell to passers-by. You can decide to be a vigilante and clean up the streets. Whatever takes your fancy, GTA2 will probably let you do it.

One thing you don't want to do is attract the attention of the police. They are now more deadly than ever. If you manage to outrun the police, they call on the FBI who then call on a SWAT team. If you defeat all of them, you are up against the military – and heaven help you.

The soundtrack is fantastic – each time you steal a car the radio is turned on and you listen to a series of original tunes and disgusting talk shows. It all sounds very much like a radio programme – the further away you stray from the transmitter the worse the sound quality gets. If you really hate the music, rather than turn your speakers down you can always destroy the radio transmitter.

DMA has even included a 'save game' option for those who found the original too hard, although you can only do it at various predefined stages. Overall, this is a cracking follow-up to the original game. If you hated the first GTA then you'll also hate this, but if you liked it then there are enough new features to make it well worth buying.

JASON JENKINS

PCW DETAILS

RECOMMENDED PERSONAL COMPUTER WORLD

★★★★★

Price *£34.99*

Contact *Take 2 01753 854 444*

www.gta2.com

System requirements *Pentium 200, 32MB RAM, DirectX-compatible video and sound cards, Windows 95/98*

System Shock 2

Lost in deep space and surrounded by mutant zombies – it could be a long trip on that cruiser.

There will always be a place in our hearts for good-quality first-person shooters that require nothing more taxing of the player than the ability to run, shoot and pick up more ammo. But System Shock 2 (SS2) is a great example of what can be achieved if you take the first-person concept to new levels by throwing in more complex role-playing and adventure elements.

The game sees you taking on the role of a hairy space marine type who pops out of stasis on a deep space cruiser to find himself trapped in the middle of nowhere. You're also surrounded by mutant zombie crewmen, murderous robots and alien nasties. The mission is to regain control of the ship and try to get back home – and if you can kill everything which crosses your path, so much the better.

Like an RPG, your character in SS2 has a bunch of personal attributes that affect his ability to perform a range of tasks. You set these attributes at the beginning of the game and your character's abilities continue to develop throughout the game by means of cybernetic implants that you plug into your brain. When you want to plug in an implant, you are given a choice of attributes to enhance, so you could, for example, choose to become a weapons expert or an all-rounder with basic skills in all the areas. The way in which you develop your character affects your progress though the game.

Although a large proportion of the game does involve performing acts of extreme violence with a range of weaponry, this alone will not allow you to progress very far. Other skills you'll need to master include hacking – which allows you to do all sorts of stuff such as opening locked doors, accessing computer systems and so on. Hacking is implemented as a kind of logic puzzle sub-game – but you can only attempt it if your character has the necessary attributes.

Another large element involves the psionic skill that gives players the ability to perform all sorts of clever tricks using the power of the mind. There are over 30 psionic abilities which can do everything from killing bad guys to levitating distant objects. On top of this, there are stacks of miscellaneous objects scattered about the ship, all of which play some part in the proceedings. The game uses a slick inventory and character management system that allows you to take control of your housekeeping without it getting in the way of the combat system.

In terms of gameplay one thing is certain – you won't get bored quickly. SS2 is a deep, multi-faceted game which offers an entertaining plot alongside varied and involving exploration. Importantly, there's no shortage of gun-toting action but there are also plenty of other elements to keep it all interesting.

What makes SS2 a winner is the sense of atmosphere produced by the convincing virtual world into which you are thrown. Play SS2 for 15 minutes and you'll really start to believe that you are trapped on a giant deep space cruiser. The graphics are fantastic with excellent attention to detail. These static screenshots can't really do the visuals justice – you have to see them move to fully appreciate them. Perhaps just as importantly the sound effects are extremely well put together – tiny details such as the way your footsteps echo a little differently when you move into an enclosed space all help to suspend disbelief that little bit more.

The most obvious comparison to this game would be with the hugely successful Half Life and we'd have to say that while that game is undoubtedly a modern classic, SS2 is an even better game and deserves to be just as successful.

LANCE CONCANNON

PCW DETAILS

RECOMMENDED PERSONAL COMPUTER WORLD

★★★★★

Price *£34.99*

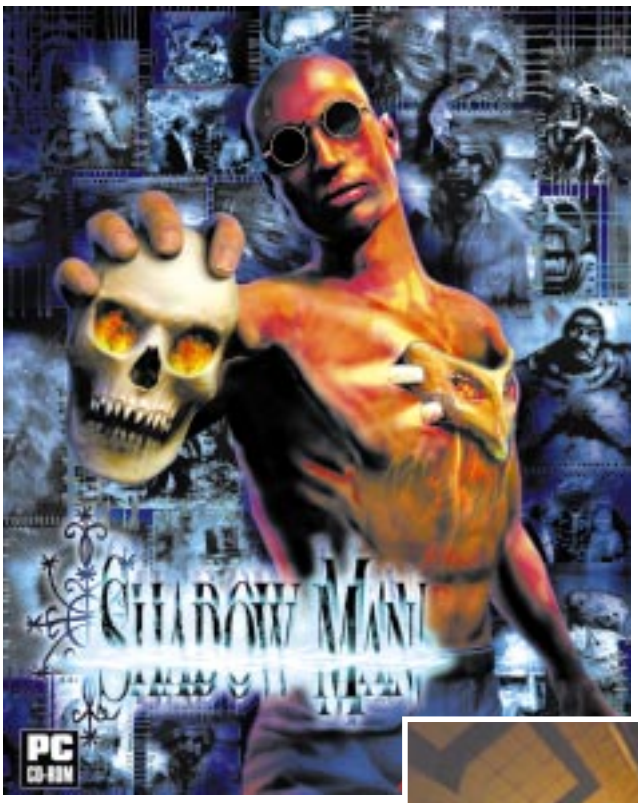
Contact *Electronic Arts 01753 549442*

www.shock2.com

System requirements *Pentium 166 (Pentium II recommended), 32MB RAM (64MB recommended), Direct X 6.1 compatible 4MB 3D accelerator card, 188MB hard disk space, Windows 95/98*

Shadow Man

What do you get if you sell your soul to a voodoo priest? A walk on the Deadside is one option.

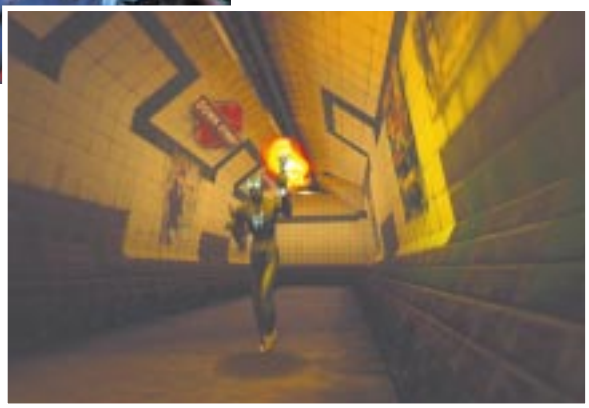


Ever sold your soul to a voodoo priest in exchange for protection and then really wished you hadn't? Mike LeRoi, the main character in Shadow Man, knows how you feel. While working as a cab driver in Chicago, one of his passengers was executed in a gangland shooting, leaving $20,000 in the back of his cab. LeRoi took the money and fled home to New Orleans, using the cash to pay for his brother's much needed life-saving operation (money wasted, as it turned out).

Unfortunately for LeRoi, the mob tracked him down and threatened him and his family: return the money or else. LeRoi had nowhere else to turn for protection other than a voodoo priest called Bokor, whose spells prevented him being killed in a drive-by shooting by the gang. His family was not so lucky, however, and LeRoi was left alone in the world at the mercy of Bokor, whom he now served as a zombie slave.

Eventually an old and wise voodoo priestess called Mama Nettie claimed LeRoi for her own by implanting the Mask of Shadows into his chest. With this he gained the ability to transcend the world of the living and enter Deadside as the Shadow Man.

The game itself is based on the comic of the same name, which explains why the plot is so convoluted. The story goes that after Acclaim gave Iguana some of its comics and asked which one it wanted to cover, Iguana jumped at *Shadow Man*. Luckily, this game does not rely on plot alone and a lot of time and effort has been spent on the graphics and sound. Using Iguana's new VISTA engine (Virtually Integrated Scenic TerrAin) the graphics are superb, even to the level that LeRoi's untucked shirt flaps around realistically as he runs, jumps and swings into action.



The game is non-linear and you are free to complete the tasks at hand in any order you see fit. Some areas cannot be accessed until you have gained specific artefacts or completed certain tasks, but on the whole you can do things in your own way.

You start in a swamp with an easy walk-through of the basic controls that you will have to use to play the game. Mastering the necessary key combinations is relatively easy, allowing you to run, jump, climb and even shimmy along ropes.

After you have completed this stage, where you have previously been led pretty much by the hand, you may find yourself a little bit lost, wandering around not sure exactly what you're meant to be doing. This problem is further compounded by the lack of any mapping ability in the game. There is no way to view a map that shows you where you have been, and its omission is a real shame. Shadow Man is not a simple game to get into, and this kind of thing only makes the task harder. Another thing that may start to get on your nerves after a while is enemy respawning – just after you think that you've killed all the 'already dead' souls, lo and behold they're back, and this time they're even less happy that they've died twice.

Another feature is that LeRoi is ambidextrous and can therefore shoot just as well with his left hand as he can with his right, meaning you don't have to worry about which hand is holding an item.

The one good thing about being immortal is that when you die, you just pass over to Deadside and continue playing. If you die while in Deadside, which is harder to do, then you just start back at a checkpoint and give it another bash. You're also free to save the game at any point, which means you could be playing Shadow Man many weeks into the future.

WILL HEAD

PCW DETAILS

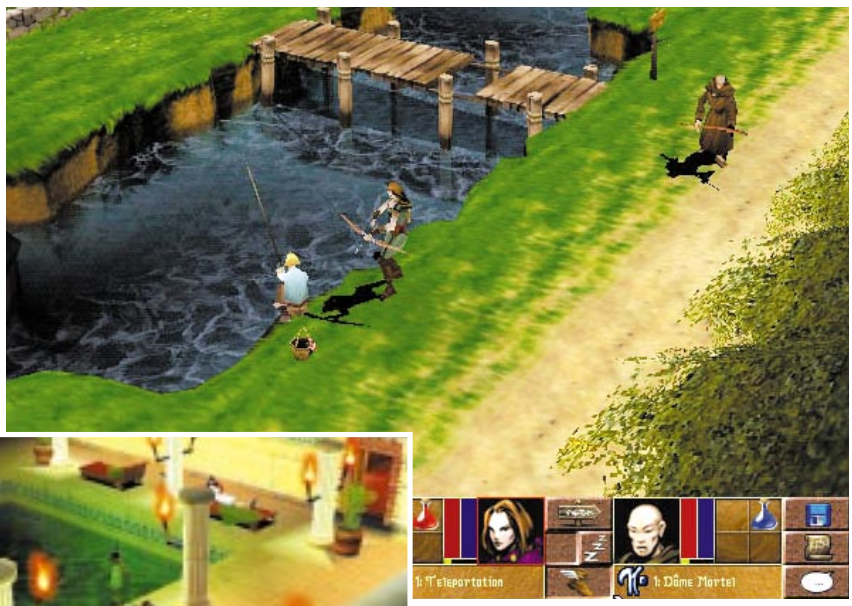
★★★★

Price *£34.99*
Contact *Acclaim 0171 344 5000*
www.acclaim.net
System requirements *Pentium 166, 32MB RAM, Direct X compatible graphics card, 80MB hard disk space (680MB recommended), Windows 95/98*

Darkstone

If you're too impatient to wait for Diablo 2 you'll love this addictive role-playing game.

A couple of years ago Blizzard released a revolutionary game called Diablo. This reinvented the role-playing genre by discarding the turn-based system and replacing it with a realtime environment. However, key elements of the genre remained intact, such as experience points, equipment upgrading and multiple-level dungeons. Diablo was a massive success and many game players, including myself, have been sitting on their hands waiting for Diablo 2 to appear. Unfortunately, we're still waiting for this fabled sequel, but in the meantime Delphine Software has given us Darkstone.



Darkstone is just so much like Diablo it's uncanny. That said, the whole thing is more like a homage to the greatness that is Diablo, rather than a rip off. The graphics are a lot more polished and the characters far more detailed than Diablo, but there's no denying that it's aimed at all those too impatient to wait for Diablo 2.

Before starting your adventure, you have to choose your character. There are six classes to choose from, assassin, thief, sorceress, wizard, amazon and warrior. Realistically there are only three classes, with male and female versions in each of them, but it's good to have the extra choice. What sets Darkstone apart from Diablo is the ability to control two characters instead of just one. Of course, this gives you twice the firepower, but there's something not quite right about this method. Both the characters just wander around in tandem and you seem to have no definite control over either of them. It's also easier to identify with a single character, since you can think of it as being you. That said, maybe it's just my love of Diablo that made Darkstone far more enjoyable with a single character.

The amazon and warrior are the standard fighter class, happily hacking at foes with their swords. The thief and assassin are a bit more stealthy and use a bow and throwing knives respectively. The sorceress and wizard have staffs but are better suited to spells. You can change the equipment that your character uses by either finding new stuff or buying it in the shop.

Your quest involves defeating the evil Draak, who has a nasty habit of turning into a dragon. However, killing him isn't as simple as it sounds; you can't just sneak up behind him and hit him on the head, oh no, you need the Time Orb. But to get the Time Orb you have to collect seven randomly placed crystals from around the mythical land. As with most games of this ilk, the story is just a by-product of the action and Darkstone has a fair bit of the latter.

The game starts off in the town where an annoying guide leads you around explaining things that are quite painfully obvious. However, it's easy to ditch this guy and get on with the adventure. Once you leave town it doesn't take long for the unfriendly locals to start attacking you, but things really get interesting when you climb down into a dungeon. Playing exactly like Diablo, Darkstone leads you through a series of rooms and corridors where you'll be attacked by various nasty characters. Some enemies will leave you gold or objects upon their deaths while others won't. You'll also find an array of barrels, boxes and chests which contain various goodies.

As you hack your way through the dungeon your experience will increase, helping you reach the next level. With each experience level your attributes (strength, dexterity, magic and vitality) can be increased.

The objects you find can either be used or sold in the town. Spell books can be read to increase your spell list, although whether or not you can read a book depends on your magic attribute.

Darkstone isn't a new or revolutionary game, but if you liked Diablo you'll love this. It's extremely playable and easy to get into. But be careful, the hours fly by at an alarming rate while you're adventuring.

Riyad Emeran

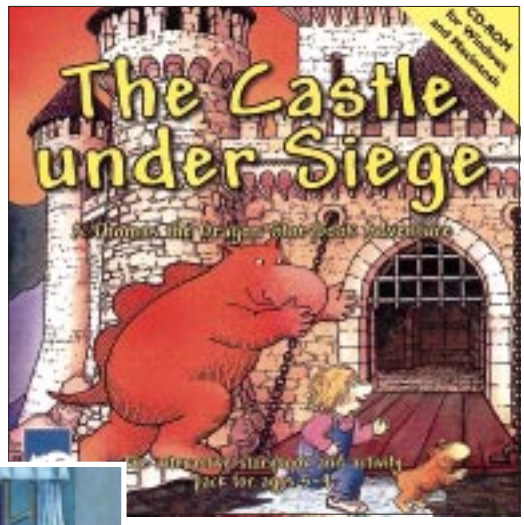
PCW DETAILS

★★★★

Price *£34.99*
Contact *Electronic Arts 01753 549442*
www.godgames.com
System requirements *Pentium 233 (Pentium II 350 recommended), 32MB RAM (64MB recommended), 4MB Direct 3D graphics card (8MB recommended), 170MB hard disk space (380MB recommended) Windows 95/98*

The Castle under Siege

Bed-time stories don't have to have fairy-tale endings with this DIY children's animation package.



Aimed at children between the ages of five and nine, The Castle under Siege is an animated storybook. Young users can follow the characters, Joanna and Frankie the dog, through Joanna's dream. Here they encounter Thomas the dragon and a wise man who rides his donkey backwards, before continuing their adventure to the castle of Sir Frederick the Good-hearted.

A storyteller can read the tale or the child can read it alone. When finished, there is the option for the children to create an animated tale of their own. They can choose between a single scene or

they can build a whole episode with up to 12 pages. Different backgrounds, characters and objects can be used, including Joanna, Frankie and Thomas who appear in The Castle under Siege story. After completion, the creation can be printed out, coloured in, and stuck together just like a real book.

As well as story-telling and story-making, users can play a number of games. In one of them, children have to locate specific animals that are hiding in Sir Frederick's castle. In another game they have the opportunity to dress Sir Frederick and his wife Gwendolyn in variety of different clothes.

With delightful illustrations, accompanied by some beautiful music, The Castle under Siege is the perfect software tool for stimulating a young child's writing and creative skills.

ETELKA CLARK

PCW DETAILS

★★★★

Price *£19.99*
Contact *Ransom Publishing*
01491 613711
www.ransom.co.uk
System requirements *Win 3.1 or higher, 486DX 100MHz processor, 12MB RAM, Double-speed CD-ROM drive*

British Isles Explorer

X marks the spot but what will the weather be like once you get there? Just pray it's not Dalness.

My First Amazing British Isles Explorer is the latest addition to the DK 'Explorer' range.

Aimed at children between the ages of five and nine, this software teaches children all about the British Isles.

The main interface is based in the bedroom of a boy called Joe. Here there are interactive animations for the user to click on. Many lead to an activity. The user can learn many facts such as that Ben Nevis is the highest mountain, and Dalness is the wettest place in the UK.

There are map outlines to label, print out and colour in and the child can even create their own weather report by placing the correct weather symbols on the map provided. A voice-over can read the report back to them or it can be saved to the television in Joe's bedroom and played through that instead.

The core task of the software is to follow Joe on his travels via the 'Explorer Challenge'. If the user chooses to take part, Joe contacts them via the animated telephone or by postcard and sets a task. Joe will often ask to meet in a certain part of the British Isles and it is up to the child to use the resources provided to find out exactly where this is. Each time Joe is found, a medal is awarded. When all the medals have been collected the child becomes a 'real' British Isles explorer.

This software will certainly help develop a child's fact-finding and map-reading skills. In true Dorling Kindersley style there is little need for improvement.

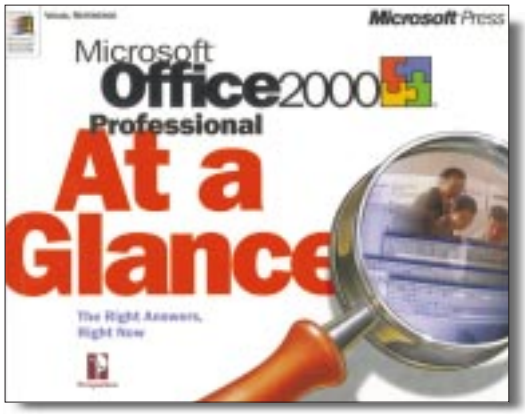
ETELKA CLARK

PCW DETAILS

★★★★★

Price *£19.99*
Contact *Dorling Kindersley*
0171 836 5411
www.dk.com
System requirements *Win 95/98, 486 DX/33MHz, 12MB RAM (Win 95) or 16MB RAM (Win 98), Double-speed CD-ROM drive, 7MB hard disk space*

Microsoft Office 2000 Professional at a Glance



This is a very visual book, with one or two screenshots and step-by-step instructions on each page. Alongside, there are boxes piled high with handy tips and techniques – in fact it's easy to suffer from information overload.

We've got mixed feelings about the design of this book. It's in landscape format, so it's very wide (about 46cm) when open. As you'll want it open alongside your PC, this is a real problem – most desks have areas of space which are higher than they are wide. So, you'll probably have to juggle your keyboard on your knee. Also, despite claiming to be a 'how-to' reference, it's not really task-oriented. The structure of the book is more that of the programs, than of tasks. Similarly, many people like to know what's new since the last version, but new features are only flagged up in the contents lists.

Another problem is the level of detail. Although this is supposed to be a book that absolute beginners can use, there are gaps. If you want to find a file from the Open Dialog, there's a lot of detail on how to press the buttons to get the screen up, but very little on the Boolean search concepts.

Again, in Internet Explorer there is no real explanation of the differences between subscribing and using channels – it just jumps in, assuming everyone already knows what channels are.

We'd have liked more about deciding which application to use (where we should use Word, and where Publisher, for example) and getting practical tasks done. Even so, the format is good and it's fairly easy to find what you need. There's a lot of information about Access, the most obscure application for beginners, and a fair spread of the others. It's not a bad book – it's just a shame it's not better.

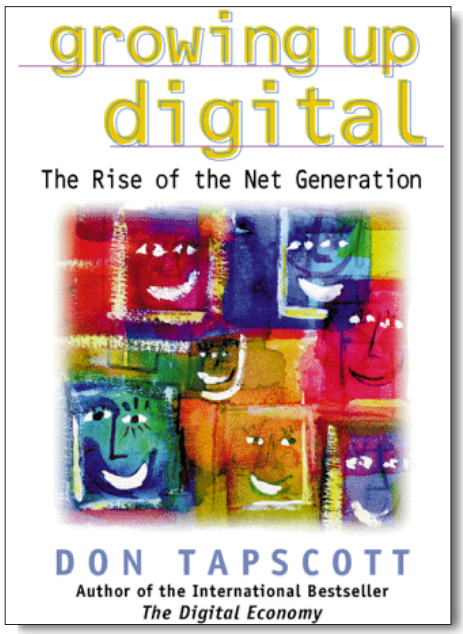
Brian Clegg

PCW DETAILS

★★★

Microsoft Office 2000 Professional at a Glance
Authors *R Romer & M Swanson*
Publisher *Microsoft Press*
ISBN *1572319372*
Price *£18.49*

Growing Up Digital



Appropriately enough, *Growing Up Digital - The Rise of the Net Generation* was written on the internet. According to the author, the idea for the book came to him in 1992 from his daughter, then aged nine.

The daughter, Nicole, was saying goodbye to a friend she had made on holiday and they were discussing how to stay in touch. The friend suggested communicating via fax, only to discover that Nicole's parents did not have one. But Nicole suggested they could communicate via computers. 'The discussion, which predated the web and the explosion of email, precipitated a series of events which resulted in this book,' Tapscott writes.

The fact that Nicole sounds like a dreadfully precocious nine-year-old does not detract from the fact that she represents a whole new generation, what Tapscott describes as the N-Genders or 'the Growing Up Digital Kids'. The book was built around research carried out on the web by a team led by 24-year-old Kat Baggott, who held discussions on the net with over 300 young people between the ages of four and 20.

Nicole, it seems, is not exceptional. The book is littered with quotations from children echoing her interests and sympathies. 'To me growing up digital means having fun while you're learning,' says eight-year-old Christopher.

The book takes us through the various stages of the Net Generation and their interests. Chapters are devoted to the N-Generation at play, as consumers, in the family and at work. In the final chapter, 'Leaders of the Future', Tapscott suggests that the N-Generation will use their technology to shape the body politic.

As the book points out: 'In the 1992 [US] election many people cringed when Ross Perot proposed the electronic town hall, conjuring up the image of the electronic mob.' Perot, surely no N-Gender, had his ideas overwhelmingly rejected by the US electorate. Perhaps the younger generation will feel more able to accommodate them.

Sean Hallahan

PCW DETAILS

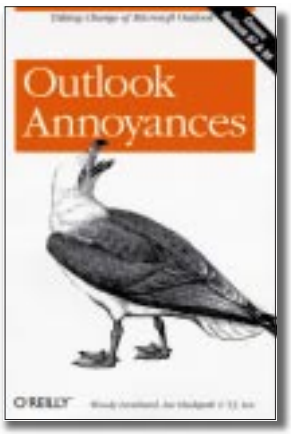
★★★

Growing Up Digital
Author *Don Tapscott*
Publisher *McGraw Hill*
ISBN *0070633614*
Price *£16.99*

Outlook Annoyances

O'Reilly's *Annoyances* series is an ambitious attempt at identifying gaps, problems and faults in the major packages on the market, and offering solutions on how to circumvent these and make your life easier.

With that in mind it is easy to understand why *Outlook Annoyances* is such a good choice. Microsoft's Outlook is one of those packages so full of rough edges that it could probably support an even larger book. The book works hard to explain what is not perfect with Outlook, even if it is just an annoying little quirk, and then identifies a solution and explains in easy terms how to implement it.



It is written in a dry, no-nonsense style that almost succeeds in hiding away the true quality of the book. There are no flamboyant explanations for some awful design features and no wry or ironic commentary, but it still ends up feeling like a humorous piece of work. There are few illustrations and the occasional example is there because there is no other way of explaining what to do. Very clean and pragmatic.

Annoyances from O'Reilly is one of our favourite hands-on IT series, and this particular book is a good example. It really does enhance the potential power of Outlook for a wide variety of users.

JELENA RUPNIK

PCW DETAILS

★★★★

OUTLOOK ANNOYANCES
Author *W Leonbard, L Hudspeth, TJ Lee*
Publisher *O'Reilly*
ISBN *1565923847*
Price *£18.50*

Official Fighter's Kompanion

Claiming to be the Ultimate Guide to Mortal Kombat 4, this book boasts every move for every character, exclusive combos, versus codes, stage select codes, hidden characters and strategies, and moves for Goro and Noob Saibot.

The 144-page full-colour, A4 book has been presented almost in a graphic novel style. The table of contents lists all of the characters, with their headshots for easy recognition, and a brief guide to what's new and what's no more in version four.

Kombat Basics kicks off the book with a look at the default controls and custom controls for the PlayStation, and Nintendo 64, as well as a run-through of some of the more basic moves – such as ducking, spinning, uppercuts and jump-kicks.

Each character is profiled in the book, and you can flick through a series of screenshots of that character's various moves, along with details of how to execute them. There are Special Moves, Weapon Moves, Fatalities and Pits, Air Combos, Ground Combos, Corner Combos and Weapon Combos. Finally, each character has a strategy profile, telling you how best to fight with that character against either a human or the computer and how best to fight against that character.

For the Kombatant in need of some back-up, this book is a must.

STEVE MASTERS

PCW DETAILS

★★★★★

OFFICIAL FIGHTER'S KOMPANION – MORTAL KOMBAT 4
Author *James MK Fink*
Publisher *Midway*
ISBN *1566867959*
Price *£10.95*

TOP 10 books

1. **Dilbert: the Joy of Work** — Scott Adams
2. **Microsoft Office 2000 Professional at a Glance** — R Romer & M Swanson
3. **Business @ the Speed of Thought** — Bill Gates
4. **Rough Guide to the Internet 1999** — Angus J Kennedy
5. **Information Rules: A Strategic Guide to the Network Economy** — Carl Shapiro & Hal R Varian
6. **A History of Modern Computing** — Paul E Ceruzzi
7. **Blur: The Speed of Change in the Connected Economy** — Stan Davis & Christopher Meyer
8. **C++ Unleashed** — Jesse Liberty
9. **Infinite Loop** — Michael S Malone
10. **Running Microsoft Office 2000 Professional** — M Halvorson & M Young

To buy these books and get discounts on the books reviewed in PCW, visit the VNU website at www.vnu.co.uk

We go back to the future to see how many of the new ideas we've reported on became a reality.

Past, present, future

We at *PCW* are always looking ahead to new technologies, making sure you get a sneak peak at ideas that might change the way you live your life. So on the eve of the millennium we take a look back to see how many of these ideas have been put into practice and which fell by the roadside.

We have not had a bad success rate: we predicted MP3 back in August 1997, the onslaught of Linux for web servers at a time when many people assumed it was only for technofreaks (June 1996) and interactive broadcasts long before Sky started using the idea for the footie (September 1996). In June 1997 we eagerly awaited 3D audio, which finally turned up in products a year or so later. And we reported on a few ideas that were outlandish at the time, but now seem old hat, such as cheap 3D graphics accelerators which would soon be in every PC, and a wonderful idea of Demon's to provide local rate calls to your ISP, allowing you to surf the world for the same amount it would cost to call your next door neighbour. Similarly kids' TV has never been the same since we talked about fully computer-generated cartoons.

▲ONE IN THE EYE: CASH POINTS WHICH SCAN YOUR IRIS TO CHECK YOUR IDENTITY ARE ON THE HORIZON

There have been two clear threads to all the research that is going on: how we interact with our computers and how we build the supercomputers of the future.

We first looked at biometrics in March 1997. This is the use of our physical characteristics to identify ourselves. After all, PIN numbers can be hacked and signatures forged. You will also soon be able to safely forget your PIN number, as iris scanners, reported in May 1998, are fitted to cash machines. These scanners take a picture of your iris and check its characteristics against a database. This system has been trialled and could come to a cash point near you soon.

You may have to wait a little longer before thermograms of your face, as reported in March 1998, will let you into your building. We all get hot in different places on our faces and a heat-sensitive camera can take a picture and identify us from our hot spots.

We have also looked at different ways of interacting with our computer, ditching the mouse and the keyboard. How would you like to wave your hand around in the air instead of using a mouse, as we reported in February 1998, or use gestures to navigate a virtual reality environment (June 1998)? Or you could use your facial muscles to control a computer (December 1997) – no this does not mean acquiring a series of facial ticks, but rather fixing a few sensors onto your forehead and under your eyes to detect which way your eyes are looking. More scary is the report in the same article of implants under the skull which monitor the brain's activity and pick up any signals intended to induce movement. This has been successfully used in trials for those with artificial limbs, who can just think about moving their leg or arm and the artificial limb will respond.

A little more Orwellian was the project reported in November 1996 to have a silicon chip implanted at the back of the eye that would record everything we saw throughout our life.

Perhaps some of the most interesting developments have been in the building of computers of the future. We reported on Quantum computing in September 1996 and have featured several types of molecular computing using everything from nerve cells to DNA to build a living computer. The most promising technology, though, is nano-technology, which we first looked at in July 1996 and is now the buzzword in computing circles.

Sadly some of the best ideas never came to fruition, such as the flat speakers which were going to appear on every notebook, being stored behind the screen and pulled out when needed. Self-repairing computers (April 1998) have yet to solve those little hardware niggles, and 3D images suspended in mid-air and viewed without glasses have also yet to appear. And of course that old chestnut the wearable computer is still a long way off.

However, there is much to look forward to, especially in the way we interact with our PCs. Here's to the next millennium of innovation.

ADELE DYER

order form

Use this form when you order by phone, fax or post.

PERSONAL COMPUTER WORLD

SUPPLIER'S DETAILS

COMPANY .....

SALESPERSON'S NAME .....

ADDRESS .....

.....

.....

..... POSTCODE .....

DATE OF TELEPHONE ORDER ..... / ..... / ..... TIME .....

CUSTOMER DETAILS

NAME .....

COMPANY .....

ADDRESS .....

.....

.....

..... POSTCODE .....

DATE OF TELEPHONE ORDER ..... / ..... / .....

ORDERED BY: ❑ TELEPHONE ❑ FAX ❑ POST

ORDER REFERENCE NUMBER (IF QUOTED) .....

DESPATCH REFERENCE NUMBER .....

ADVERT APPEARED IN PCW:

ISSUE DATE ..... **PAGE** .....

QUANTITY	DETAILS OF ORDER	UNIT COST £	TOTAL £

SUB-TOTAL _____

DISCOUNT _____

CARRIAGE _____

SURCHARGES _____

VAT _____

TOTAL _____

METHOD OF PAYMENT

❑ PERSONAL CHEQUE ❑ PURCHASE ORDER ❑ CREDIT CARD

❑ C.O.D ❑ DEBIT CARD ❑ OTHER (SPECIFY) .....

CARD COMPANY .....

ISSUE NUMBER (debit cards only) .....

START DATE ..... / ..... / ..... EXPIRY DATE ..... / ..... / .....

CARD NUMBER ..... / ..... / ..... / .....

SIGNED .....

DATE ...../...../.....

DAYTIME TELEPHONE NUMBER .....

DELIVERY ADDRESS .....

.....

..... **POSTCODE** .....

AGREED DELIVERY DATE ..... / ..... / .....

Purchasing Guidelines

There are several steps you can take to help ensure that the buying process is smooth and trouble-free. We'd like to suggest these main guidelines:

• KEEP RECORDS

When you phone a supplier, make a note of the name of the person you speak to, and when. Note down any claims they make for the product in which you are interested, or any specifications they mention. If you are unsure that what they are offering is right for the task, then ask.

• GET A FULL SPEC OF THE MACHINE

Before you place an order for a machine, insist on being faxed or emailed a full specification, detailing all components and peripherals. Check what is included: for example, when buying a printer, are all cables and cartridges bundled in? If you've used a review in a magazine to guide your decision, make sure that what is quoted matches what you have read. Sometimes, machine specifications can change from the model sent for review.

• BE CLEAR ABOUT SUPPORT AND WARRANTIES

Make sure that you get a warranty which suits your needs and is fully detailed in the quotation. If you need swift repairs, consider paying extra for an eight-hour repair service. Also make sure you understand the level of service you can expect to receive, including who pays for couriers if your machine has to be returned for repair.

• USE CREDIT CARD PROTECTION

When you place your order, use a credit card. The Consumer Credit Act ensures that credit card purchases between £100 and £30,000 are covered. Check the address to which the goods will be sent. Often, if you buy with a credit card you can only receive the goods at the address on the card. If you are buying over the Internet, make sure you are using a secure server, sometimes denoted by the prefix 'https'.

• SET DELIVERY DATE AND CHECK WHAT'S DELIVERED

This gives you some comeback if the goods are not delivered on time. When the goods arrive, check the packaging before you sign for them, to guard against damage in transit.

PERSONAL COMPUTER WORLD BUYERS' CHARTER

MAIL ORDER PROTECTION SCHEME (MOPS)

When you order goods as a *private* individual reader from a UK supplier's advertisement in *Personal Computer World* and pay by post in advance of delivery to that Mail Order Advertiser, which subsequently ceases to trade and goes into Liquidation or Bankruptcy prior to delivery of such goods, you may, under the 'Buyers' Charter', qualify for compensation, providing:

1. You have not received the goods or had your money returned.
2. You have followed the *Personal Computer World* guidelines when placing your order (see over).
3. You have taken all reasonable steps to effect delivery or refund.
4. You have retained irrefutable proof of purchase, for verification purposes:

a) A copy of the original advertisement from which the goods were ordered.
b) Comprehensive proof of payment.

GUIDELINES

Claims must be submitted so as to arrive 'NOT EARLIER THAN TWENTY-EIGHT DAYS AND NOT LATER THAN THREE MONTHS' from the official on-sale date of the magazine. Claims must be submitted to the Customer Services Manager IN WRITING, summarising the situation and lodged strictly within the time schedule stated. *Claims received outside this period will not qualify for consideration for compensation under the 'Buyers' Charter'.*

Once a supplier who has advertised in this magazine has become subject to either Liquidation or Bankruptcy proceedings and upon completion of all winding-up procedures, *Personal Computer World* guarantees to expeditiously process those *private* individual readers' claims made and submitted, in accordance with those procedures outlined, up to the following limits.

a) £2,000 in respect of any claim submitted by one Private Individual Reader.
b) £100,000 in respect of all advertisers so affected in any one year.

These sums define the Publisher's maximum liability under the scheme, and any additional payments above and beyond these thresholds will be entirely at the Publisher's discretion.

As soon as legal confirmation that a state of liquidation or bankruptcy exists, the processing of claims will immediately commence. If, however, assets are available and the receiver/liquidator appointed confirms that an eventual payment will be made by way of a dividend, all claims under the 'Buyers' Charter' will be subject to re-processing and will take into account any shortfall which may then exist. Payments under the scheme will also take into consideration the obligations and liabilities of other interested parties, such as credit card and/or insurance organisations etc.

EXCEPTIONS

This guarantee only applies to advance postal payments made by *private individuals in direct response for goods itemised/illustrated in display advertisements*. It does not cover goods ordered from advertising Inserts or Cards, classified advertisements or MicroMart, or Catalogues obtained from, or supplied by, any advertiser regardless. *Similarly, protection does not exist in relation to purchases made as a result of reviews and/or editorial comment*.

The 'Buyers' Charter' is designed to safeguard the *PRIVATE individual reader*. It does not provide protection to any companies, societies, organisations, unincorporated bodies or any other commercially orientated outlet of any description. Neither is cover provided for orders placed from, or to, any overseas suppliers or for goods purchased for resale.

CAVEAT EMPTOR

Readers are reminded that the Mail Order Protection Scheme was solely implemented to provide protection to the private individual when goods are ordered 'Off the Page' and paid for by post. *It was not designed for, nor will it offer any protection, in the event whereby goods are purchased via the Internet*.

CREDIT CARD PROTECTION

Always pay by credit card when ordering goods valued in excess of £100, thereby ensuring maximum protection in the event that an advertiser ceases to trade prior to such goods actually being received.

DISCLAIMERS

Readers are reminded that the opinions expressed, and the results published in connection with reviews and/or laboratory test reports carried out on computing systems and/or related items, are confined to, and are representative of, only those goods as supplied *and should not be construed as a recommendation to purchase*. Whilst every precaution is taken to ensure that reliability and good business practices prevail, the Publisher cannot be held responsible for the overall trading activities of any supplier referred to, or advertising within, this publication.

HELPING HAND

Each month ***Anthony George****,* ***our customer services manager****, will give advice on what to watch out for when buying computer equipment off-the-page.*

As promised, here are a few facts about your rights to cancel, withdraw or terminate credit agreements.

☛ **Cancellation:** When you enter into a face-to-face agreement with a lender and sign the document at home, you are entitled to a minimum five-day cooling-off period when you may cancel penalty-free. For example, if you buy encyclopedias on credit from a door-to-door salesperson, the five-day cooling-off period commences the day after you receive your copy of the agreement signed by the lender. This does not apply where the credit is less than £50. The lender usually provides a form for cancellation but you can advise in writing, within the specified period, that you intend to withdraw. All goods or money received must be returned.

Provided credit is repaid within one month or before the first of any instalments are due, interest will not accrue and you will be entitled to a refund of any deposit you may have paid.

The cooling-off period does not apply to agreements signed at a shop or business premises, or entered into by post or telephone. A mail-order agreement signed at home, not in the presence of the lender, will not entitle you to a cooling-off period or penalty-free cancellation once the lender has accepted.

☛ **Withdrawal:** If an agreement is signed at home or in a shop, you are entitled to withdraw before the lender signs. If you posted a signed credit card agreement, you can still withdraw, provided the card issuer has not processed the transaction. The lender must be notified in writing or, if verbally, in the presence of a witness, before the lender signs and returns the agreement to you. All goods and/or money received must immediately be returned.

If you have paid a deposit or handed over goods in part exchange, you are entitled to their return or the cash equivalent. If the lender fails to comply, you can sue for the return of the money or the value of the goods.

☛ **Termination:** In the case of hire-purchase or credit-purchase, where the goods do not become yours until the total has been paid, it is possible to terminate the agreement once you have paid half the amount or less. If you agreed to buy goods through a dealer's lease-purchase plan, you can return the item once half the total has been paid but will not normally be entitled to receive any money back. Where an agreement is terminated very early, a court may decide that less than half the total owed may be paid.

Anthony George, Customer Relations Department, VNU Business Publications, VNU House, 32-34 Broadwick Street, London W1A 2HG

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Anthony George, Customer Relations Department, VNU Business Publications, VNU House, 32-34 Broadwick Street, London W1A 2HG

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Tech Direct	375-390, 454
Technomatic	341-374
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Viglen	obc
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CD Rom	
CD Rom	
Dabs Direct	222, 309-340
Choice Systems	285
Evesham Micros	92-93
PC World	164-165
Pico Direct	132-133
Plextor	119
SMC Computers	231, 391-422
Tech Direct	375-390, 454
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Evesham Micros	92-93
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SMC Computers	231, 391-422

COMPANY	PAGE N°
Tech Direct	375-390, 454
Technomatic	341-374
Viglen	obc
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Budget PCs	September-99	11	2013
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Pentium III 550MHz PCs	August-99	11	2015
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Hardware Group Tests	**Issue**	**Pages**	**Code**
Digital video	January-99	13	2111
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Building a small network	September-98	5	2402
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Anti-virus	August-99	5	2521
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Service & reliability survey	November-99	10	2523

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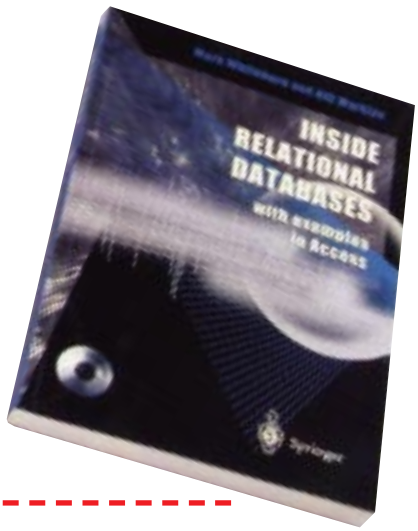
Inside Relational Databases



(reviewed in PCW November 97, p329)

- Written by Mark Whitehorn, who writes *PCW's Hands On Databases* column.
- Explains all you need to know to create efficient relational databases.
- Avoids the usual database jargon.
- Includes masses of examples using Microsoft Access.
- Source code for all examples is on the accompanying CD.
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Remembering the Future

- Collected interviews from *Personal Computer World*, including Bill Gates, Michael Dell of Dell Computers and Intel's Andy Grove.
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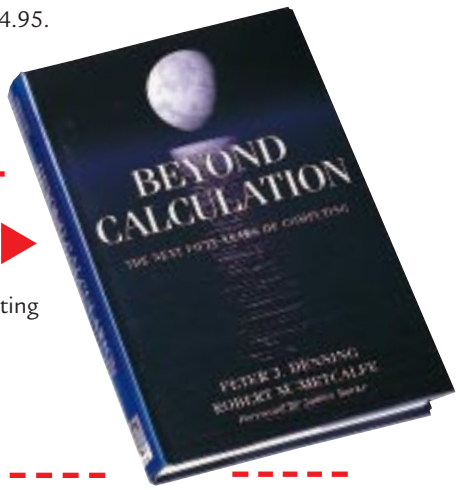

- World-recognised experts predict the future of computing in this ground-breaking book.

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- Heavy-grained, padded, black, PVC CD wallet with a velcro fastener.
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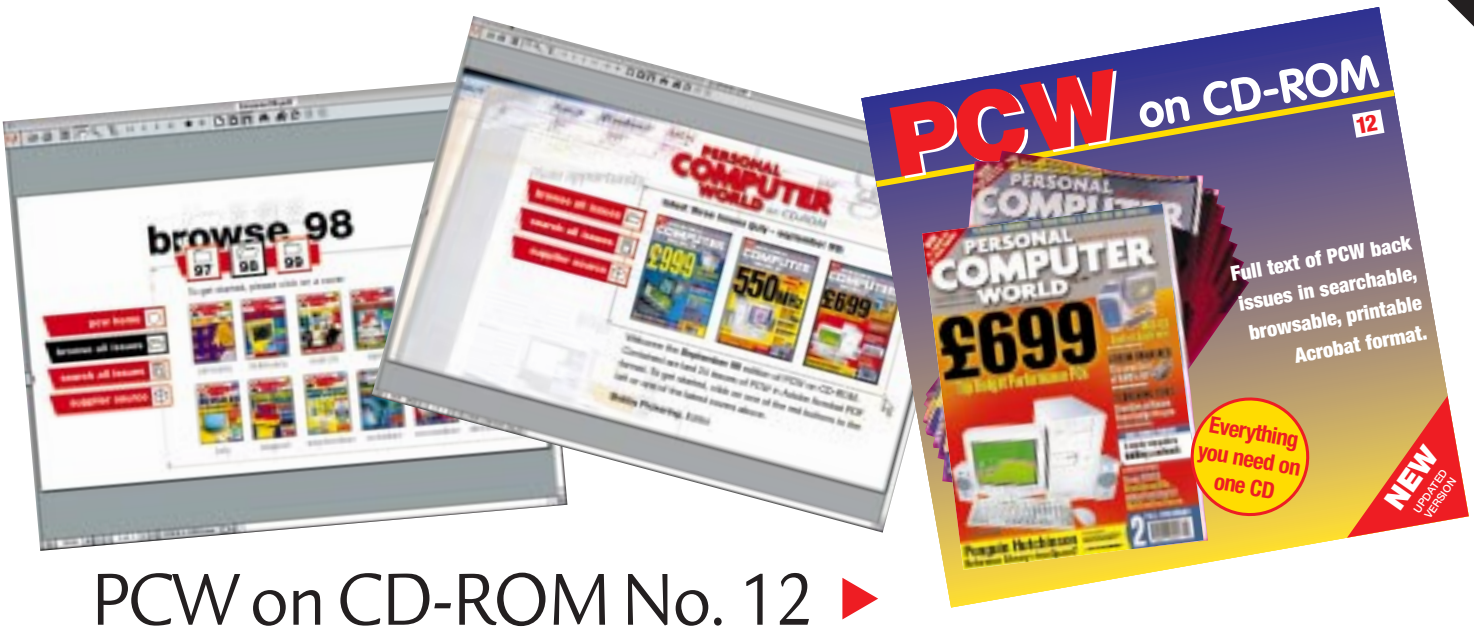

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- *PCW* on CD-ROM contains every news item, review, group test and *Hands On* article from every issue, in acrobat format. Acrobat uses special compression technology so that we can squeeze nearly 5,000 editorial pages onto a single CD-ROM. All articles appear on-screen exactly as they originally appeared in the magazine. You can print out articles, browse through past issues, or search by subject or keyword in seconds. In browse mode you can choose which year you want to search through. Look through the contents page of the issue you want to browse and click on any article to go straight to that page. In search mode you just enter the words you want to search for.

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Quickie

This month's quickie comes in the form of a simple word problem.

Can you think of an English word which ends in the letters MT?

This month's Prize Puzzle

I think this one will definitely cause the PCs to buzz a bit. I can't see any way in which an analytical solution is possible – but someone is bound to prove me wrong.

In a dream I had the other night, my brother and I were in a huge marathon race in which all competitors were given numbers – assigned sequentially, starting at one. The elite runners in the race (which we were not!) had numbers less than 100. My brother's number was lower than mine.

Given that there were fewer than 100,000 taking part, just how many runners were there?

Answers please on postcards or backs of sealed envelopes, to: *PCW* Prize Puzzle – December 1999, PO Box 99, Harrogate, North Yorkshire HG2 0XJ to arrive no later than 20 December 1999.

We will also accept solutions by email. Send the solution and your name and address only (no explanatory notes or program listings etc) to: jj.clessa@btinternet.com

Winner of September 1999 Prize Puzzle

This was obviously too easy and we had almost 250 entries – the great majority of which came in by email. A computer wasn't really necessary to find the answer, providing you knew how to solve simultaneous equations. The solution to the problem was:

He walks at 3.75mph, jogs at 7.5mph, and cycles at 10mph. From A to B is 37.5 miles, B to C is 30 miles, and C to A is 15 miles.

The winning entry, chosen at random, came by email from Mr Iain Roberts of Edinburgh. Congratulations Mr Roberts, your prize is on its way.

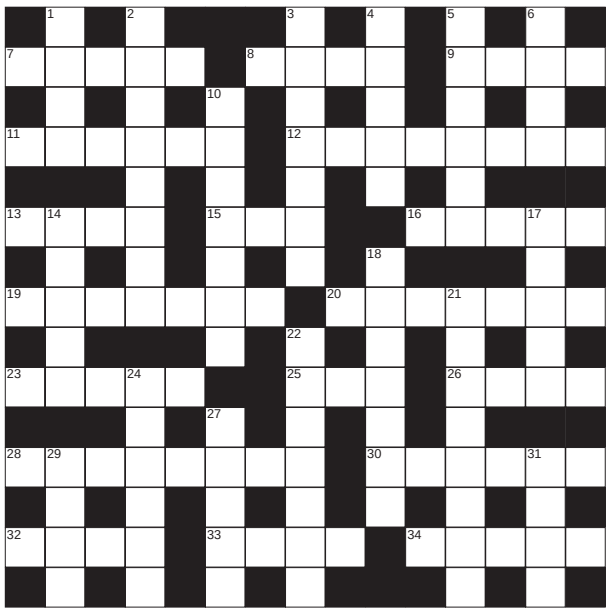
To all the others, keep trying, it could be your turn next.

- *If you send an email entry, remember to include an address to where the prize can be sent should you win.*

- *By the way, have you applied for the latest* Clessa Quickie *books at the reduced price of £2.25 each? Quite a few of you have already. For further information you can write or email me at the puzzle entry address. Alternatively, you can visit the new J J Clessa website at: http://dspace. dial.pipex.com/jj.clessa. It contains, among other things, answers to earlier quickies, a difficult puzzle (but not the* PCW *kind, ie the kind that can be solved by whirring computers), hopefully a few readers' comments, a bit of this and that – and, of course, a plug for the latest* Clessa Quickie *books!*

J J Clessa

prize crossword



ACROSS

7 Remove software glitches (5)
8 Place where crashed files are saved (4)
9 Command to look through code (4)
11 Results from an inkjet or laser (6)
12 Digital protection against external danger (8)
13 Free and incomplete software version (4)
15 Internet addressing system (abbrev) (3)
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19 IE's recently-visited websites button (7)
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23 The name for boxes in spreadsheets (5)
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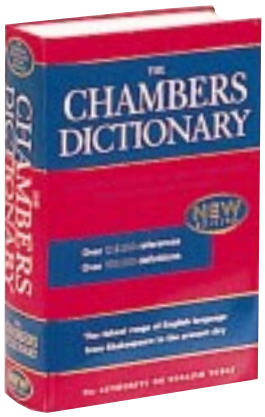
31 Catch sight of (4)



Each month, one lucky *PCW* Crossword entrant wins a copy of the new *Chambers Dictionary*.
The winner of October's puzzle is: Alan Sherratt, of Orford, Cheshire.
This time, it could be you. Send your completed crossword to: '*PCW* December – Prize Crossword', VNU House, 32-34 Broadwick Street, London W1A 2HG, to arrive not later than 30 November 1999.
• *Please state clearly on your entry if you do not wish to receive promotional material from other companies.*

Solutions to November's crossword

ACROSS
7 Full duplex 8 Fire 9 Rebooted 10 Sector 11 Attach 13 Volumes 15 Decrypt 17 Hot link 19 Buffers 21 Kermit 24 Dialog 26 Transfer 28 Word 29 Mainframes
DOWN
1 Numerate 2 Almost 3 Rust 4 Glade 5 Axes 6 Groove 8 Factual 12 Caper 14 Ozone 16 Raffled 18 Nattered 20 Unison 22 Mislay 23 Strip 25 Game 27 Alfa

Win CD Writer and labeller kit

This month *Personal Computer World* has teamed up with NEATO and Hewlett-Packard to offer a fantastic prize worth approximately £500. The prize includes the very latest CD Writer from HP and a Professional CD Labeller Kit from NEATO. In addition, 10 runners-up will receive a Professional CD Labeller Kit from NEATO worth £49.95 each.

NEATO, a specialist media labelling, packaging and presentation company, has created the ultimate software to help you create and develop your own personalised labels. NEATO's professional CD labeller kit is a high-quality package which includes everything users need to design, print and apply professional-looking CD-RW labels and personalised jewel case inserts for archiving and easy identification of the content. Also provided is NEATO's

Production Assistant CD Helpware, which contains 100 high-resolution, royalty-free background art images and a series of tutorials.

The M820e is the market-leading CD Writer from HP. Fully portable, the compact and lightweight M820e weighs less than one pound and fits into the palm of your hand. The versatile machine allows users to create, share and store up to 650MB of data, photos, music and more on each CD – the equivalent of 450 floppy disks. The M820e writes CDs at four-speed so it will write a full CD in less than 20 minutes. It reads at 20-speed – making it one of the fastest external CD-RW drives available.

For more information on either NEATO or Hewlett-Packard products, visit their respective websites at www.neato.com/a4 or www.hp.com.

To enter this competition, simply answer the following questions:
How quickly will the M820e write a CD?
What is the NEATO website address?

Win Digital MP3 Player

Pine Technology is offering seven lucky *PCW* readers the chance to win the latest in MP3 technology.

Priced at £129, Pine's D'Music Digital MP3 Player records and plays back MP3-coded files, which can be downloaded free from the internet or encoded on a PC from the user's personal collection of audio files.

The compact device, which weighs only 67g, has an internal 32MB flash memory capacity. It has been designed to suit both home and business users alike by combining everything necessary for high-quality digital audio into one small, light and easy-to-use device. The digital device ensures users do not suffer from the annoyances of jolting or media degradation associated with CD-based products.

Pine's MP3 Player allows you to play back digital files as if it were a normal personal stereo, as well as collate and edit songs via a PC to put together personalised playlists. Its voice recording function makes the device ideally suited to business users who need to record comments, conferences, or discussions.

Features include:
- **Smartcard bay** for an additional 32MB card upgrade
- **Two hours** of voice recording for each 32MB of memory
- **The ability** to download/upload any file making this an ideal portable storage device
- **Parallel port** interface, stereo headphones, software application
- **ACM** (Automatic Continuous Memorising) is a unique feature of D'Music, which enables you to automatically memorise, play back, edit, store and image signal.

To enter this competition, simply answer the following question:
What does ACM stand for?
a) Automatic Continuous Memorising
b) Automatic Continuous Music
c) Automatic Continuous MP3

How to enter the competitions

Write your name, address and daytime telephone number on a postcard or the back of a sealed envelope. Mark your card(s) '*PCW*/NEATO/HP Competition' or '*PCW*/Pine Competition' and send to the following address by 30 November 1999:

Personal Computer World
Building 960
Sittingbourne Research Centre
Sittingbourne
Kent ME9 8AG

◆ *Competitions open to residents of the UK only.*

Rules of entry

These competitions are open to UK readers of *Personal Computer World*, except for employees (and their families) of VNU Business Publications, Hewlett-Packard, NEATO and Pine Technology. The Editor of *Personal Computer World* is the sole judge of the competition and his decision is final. No cash alternative is available in lieu of prizes.

FREE™ SOFTWARE FOR SCHOOLS

***Personal Computer World* is putting education first this month in a special offer available to all our readers. Start collecting tokens now, and you can get the best software for your kids!**

TIME COMPUTERS

THE TIMES

THE SUNDAY TIMES

We're teaming up with *The Times* and Time Computers to give away £35,000,000 worth of superb educational software for schools and homes. The specially selected software, which comes from publishers such as Microsoft, Dorling Kindersley, IBM Software, the Learning Company, Lotus and Europress, will be an invaluable support to your child's education from primary through to secondary and there's plenty of stuff that adults can learn from too!

Collect your tokens from *Personal Computer World* to help your school get much-needed software and even some packages for your home. There are more than 120 educational titles to choose from and more than 25 home software titles on offer. Titles range from toddlers (Keystage 0) and primary-level software, through to 'A' level studies (Keystage 5).

WHAT TO DO

We're giving away tokens in the December, January and February issues of *Personal Computer World* (on sale from November 1999 through January 2000). Simply cut them out and collect them all.

For School tokens:

Pass on your 'For School' tokens to your child's school (or your neighbours' children's school if you don't have kids of your own!) and they will be able to collect an unlimited number of tokens to claim software.

For Home tokens:

Keep your 'For Home' tokens so that you can claim your own free software (one CD-ROM per household) and visit your nearest Time Computer store to collect the title you have chosen. Call 0800 316 2317 to find out where your nearest Time store is.

Bonus tokens:

You can also collect other tokens every day from *The Times* and *The Sunday Times* and 1,000 tokens when you buy a Time computer or up to 100 tokens when you subscribe to Netline at *www.softwareforschools.co.uk*. In addition, you can claim an extra software title for yourself when you register with Netline's free Internet service.

Offer ends on 31 January 2000. All tokens must be redeemed by the end of March 2000.
Please note only UK schools can register.
Promoter: Time Computers and News International.

Chips for Christmas, Clive Sinclair vs IBM, a not-so-portable Atari and the birth of Internet fever.

20 YEARS AGO December 1979

In the run up to Christmas 1979-style, we engaged in a seasonal evaluation of micro-toys. Donning his Santa Claus suit, David Tebbutt filled a sack full of goodies at Electronic Wonderland on Tottenham Court Road, and then delivered them into the hands of 14 delighted kiddies. It was a jolly timely thing to do, as Tebbutt noted, because the late 70s had heralded the age of the electronic toy – chips with everything.

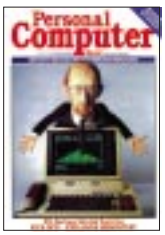
'The sounds of bleeps, whistles and jingles will be a part of our lives soon, in the same way as we remember the rattle of hoops, the clatter of clockwork and the whirr of the electric motor.'

There were 12 toys in our festive group test, including Electronic Battleships, which had a sonar sound that 'can be very irritating' – although 'the shells whining and the whumph of explosions made up for this'. At £27.95, it was deemed a tad expensive. The 'extremely well made' UFO Masterblaster featured flying saucers that had to be blown up before they landed. There were no exciting noises and visual effects, and the toy was more a hit with adults than kids.

High marks went to Merlin – a £19.95 device that contained six games in one (noughts and crosses, blackjack, music generation, magic square, echo and mindbender). Although not an immediate hit, it grew in popularity as people discovered its hidden complexity.

Top marks went to Big Trak, a giant tank that could be pre-programmed. It was expensive (£29.95) but extremely well made, and Tebbutt recognised that it appealed to dads as well as kiddies. Therein lies an age-old truth about what gets bought for kids at Christmas – parents have to fall in love with them, too ■

15 YEARS AGO December 1984



We had a choice for our cover this month: two big-name machines from two serious corporate manufacturers – ICL's One Per Desk, with a built in telephone, and IBM's follow-up to the market-defining PC, the IBM PC AT. We opted for the former, possibly because we're a British magazine, and the ICL machine had a connection with contemporary wunderkind, Clive Sinclair.

We expected the One Per Desk was going to set executive hearts racing because it aimed to be an all-in-one device, which integrated voice and data calls with a computer containing Sinclair chips and system software taken from the QL. Another home-grown optional extra was the Psion Xchange suite of applications. Our reviewer thought it was an elegant solution and would score heavily in terms of price performance. Time and the marketplace have delivered a different verdict: the chips and the software weren't Wintel and the whole thing too quirky and unconventional for its target, highly-conservative, market.

The IBM PC AT, on the other hand, was a perfect follow-up to the genre-defining PC launched three years earlier. There was more power – provided by the Intel 286 processor, a choice of operating systems – PC-DOS 3 and the multi-user Xenix system (although, as we noted, there wasn't a great deal of application software for the latter). Things that had irritated previous users, such as the keyboard, had been redesigned. The machines you buy today don't look much different from this one.

Inside, however, and in terms of price, it was a different story. A basic system with 256KB of RAM and a 1.2MB floppy set you back a whopping £2,951. If you wanted 512KB of RAM and a 20MB hard drive, then you'd have needed £4,281 in the bank. It was a good solid product, we concluded, 'that nods toward innovation by using a new chip and a high-capacity disk drive, and will sell by the bucket-full.' We forgot to add: spark a revolution by consolidating the position of the Wintel alliance, and creating the conditions for a clone industry to emerge. ■

10 YEARS AGO December 1989

We took the wraps off HP's own object-oriented data management system, NewWave, which allowed data from different applications to be merged into a compound document. By using hotlinks, the compound document could then be updated if a source file was changed in any way.

However, we pointed out that you only got the best from NewWave when running applications that were specifically tailored for it, and there weren't many of them available. It was also complex to set up.

We did, however, feel that it had 'the look of things to come', and that's probably how the developers at Microsoft saw it as well. HP's little baby would not find a great deal of success in the big bad world, and eventually the company submitted to the realities of a Microsoft-dominated world.

We also took the wraps off the Atari Stacy 4, a 'portable' aimed at the printer market, which had been hastily assembled for us (and, consequently, arrived sans power supply – ooops!). After trying a very expensive battery option, and failing to get it to boot, we asked Atari to deliver another system the following day.

Eventually we got the machine working, but the whole saga didn't make reassuring reading, especially our conclusion: 'it is too heavy and battery life is a joke'. ■

5 YEARS AGO December 1994

Our cover screamed 'Internet Fever!' as we served up two steaming-hot interviews – one with Tim Berners-Lee ('The man who wove the web') and the other with Barry F Berkov, a vice-president at CompuServe, which at that time was the biggest international ISP, and the company that gave us the GIF format for graphics files.

Yet while both predicted that the web, Internet applications and email would transform the way that we use PCs, there was very little evidence of it elsewhere in the magazine. There were no comparative reviews of web editors (as we have in this issue, on page 200), no workshops on using webcams (see page 224) or registering domain names (see page 227), or CGI scripting (see page 235). In five years, things have changed dramatically. ■